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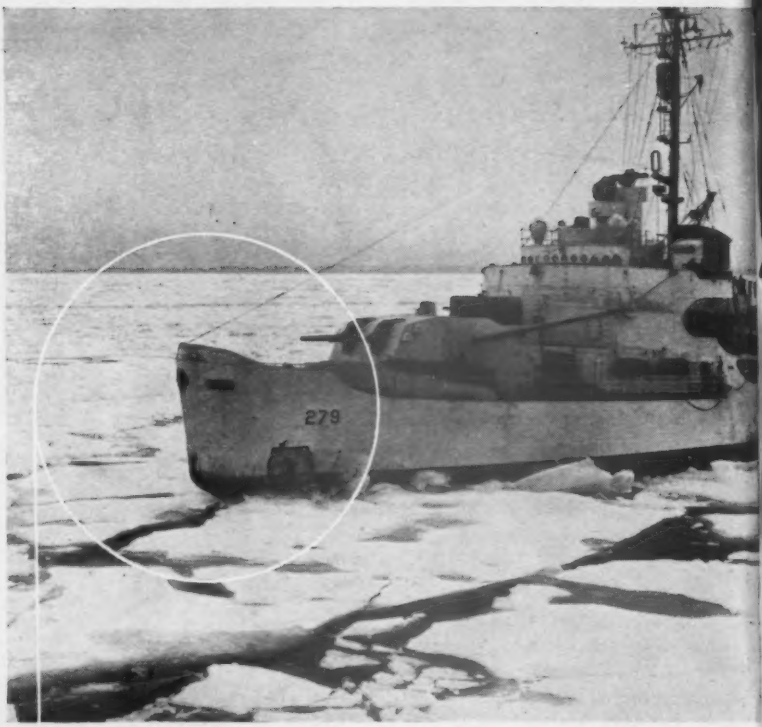

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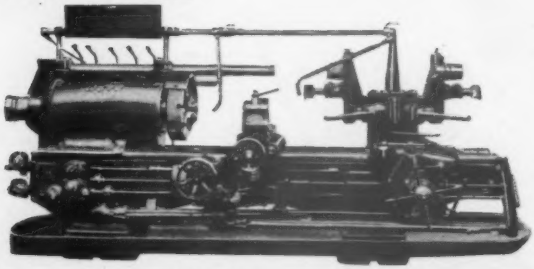

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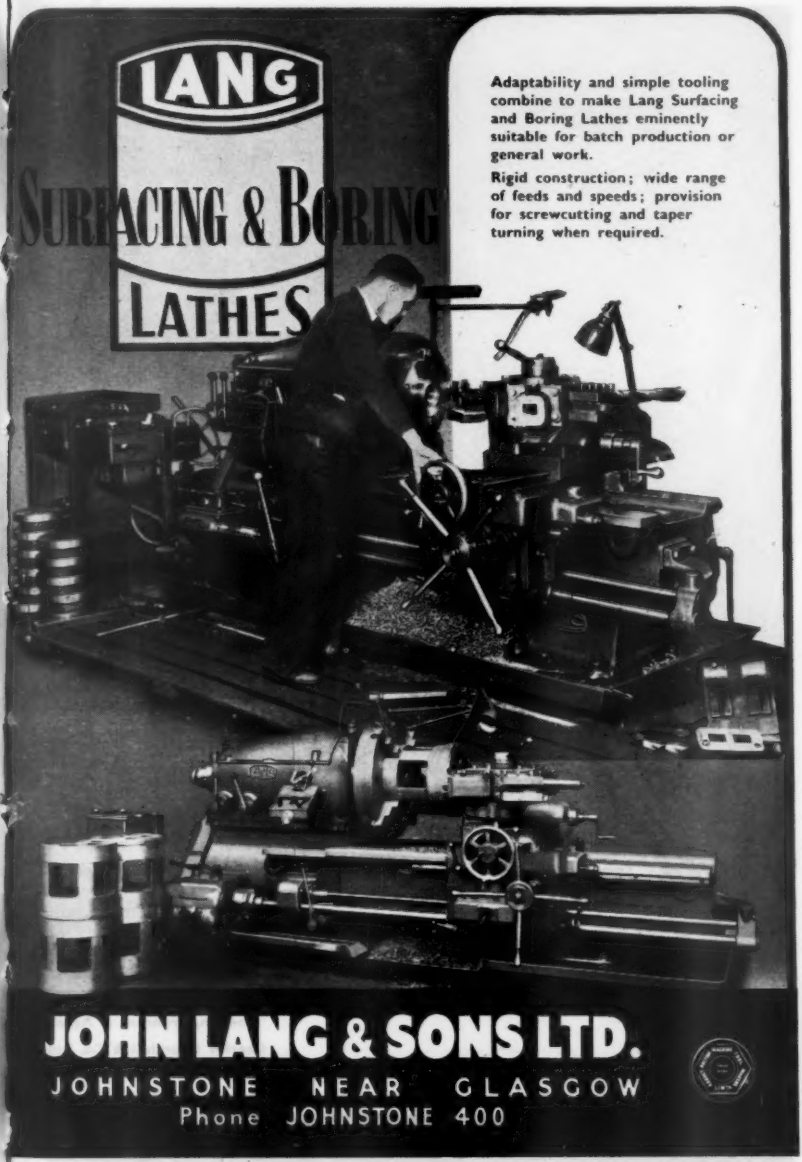
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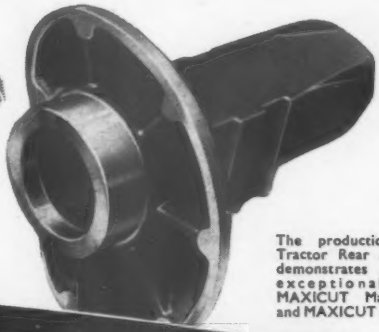

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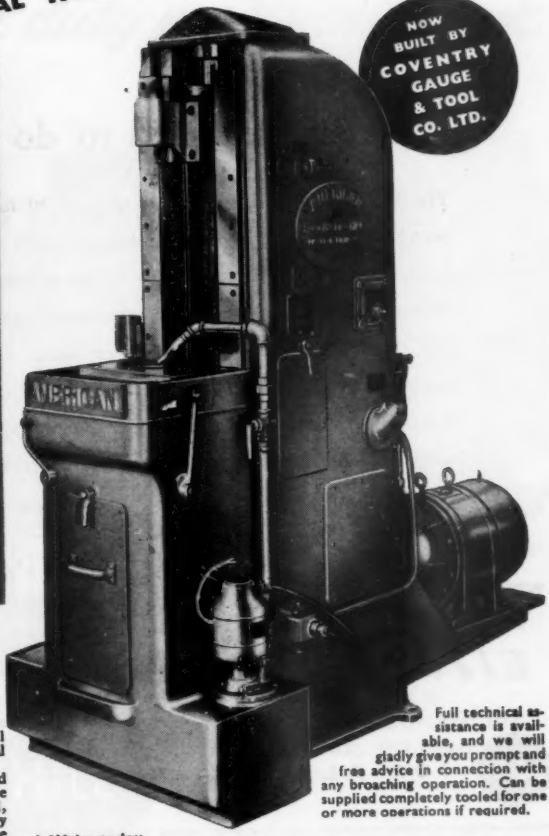

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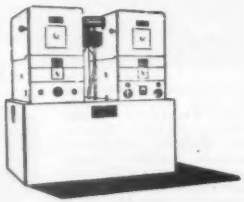

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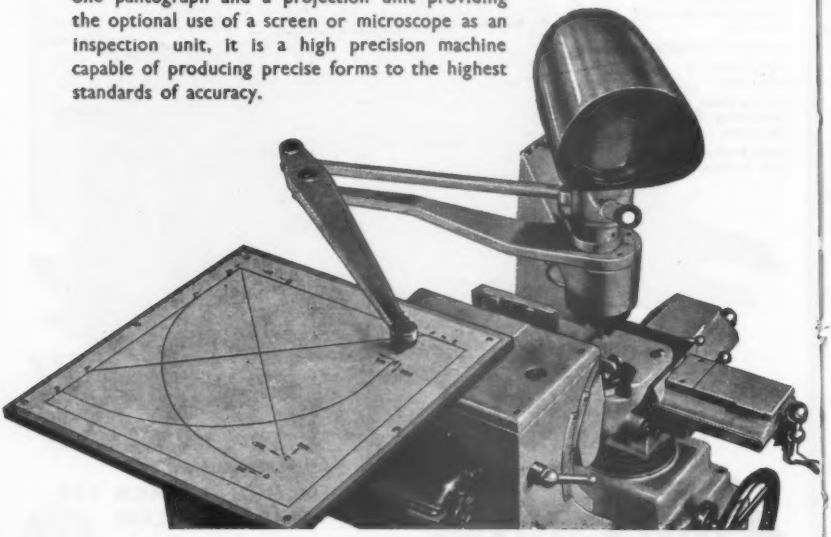

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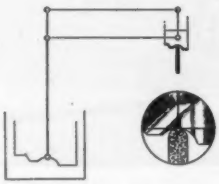

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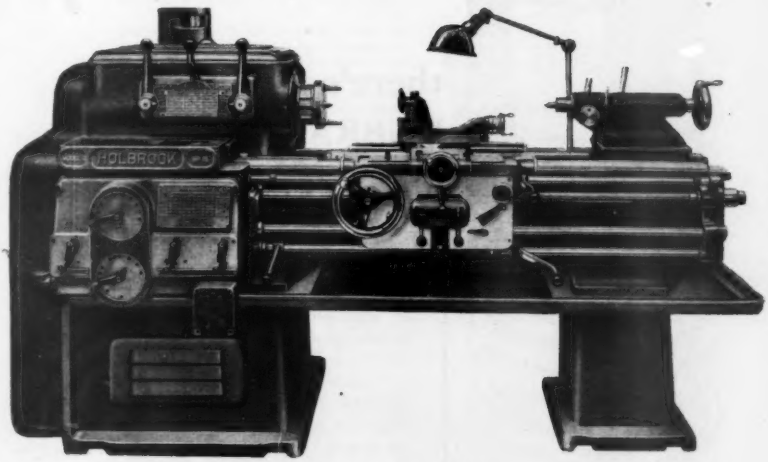

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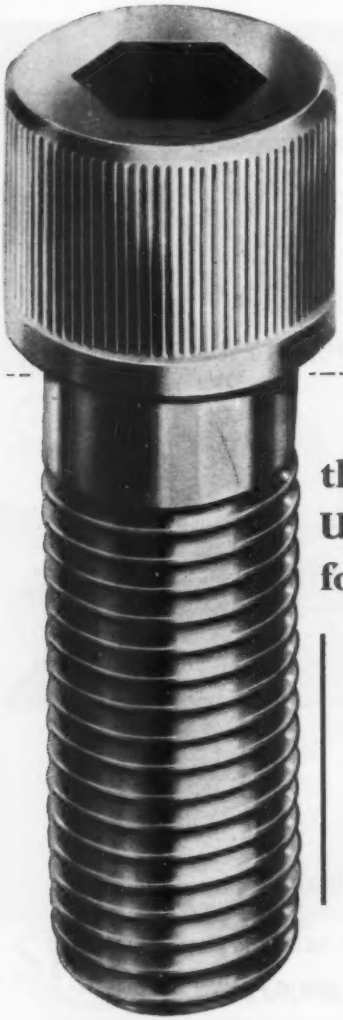

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Vol. 31, No. 12, December 1952

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The Institution of Production Engineers does not accept responsibility for any statements made or opinions expressed in any papers published in the Journal of the Institution.

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INSTITUTION NOTES

December, 1952

Conference on "Problems of Aircraft Production"

As announced in the November issue of the Journal, the Institution of Production Engineers will hold a Conference on "Problems of Aircraft Production" at the University of Southampton, on Friday and Saturday, 19th and 20th December, 1952.

The Conference, which is being organised by the Southern Section Committee, will be opened by a Luncheon to be held at the University on Friday, 19th December, when the Speaker will be Brigadier A. R. Low, C.B.E., Parliamentary Secretary to the Ministry of Supply, and will take the form of three main Sessions, as follows:—

Session I—Friday, 19th December, 2.30—4.30 p.m.

"Designing for Production"

Speakers: (a) R. W. Walker, F.R.Ae.S., Chief Designer, Gloster Aircraft Co. Ltd.

(b) Dr. A. E. Russell, B.Sc., F.R.Ae.S., F.I.Ae.S., Chief Designer, Bristol Aeroplane Co. Ltd.

Session II—Friday, 19th December, 5.0—7.0 p.m.

"Prototype to Production"

Speakers: (a) C. E. Fielding, O.B.E., A.F.R.Ae.S., M.I.Prod.E., Works Director, A. V. Roe, Ltd.

(b) H. Povey, A.F.R.Ae.S., Works Director, De Havilland Aircraft Co. Ltd.

Session III—Saturday, 20th December, 10.0—11.30 a.m.

"The Impact of Modifications on Production"

Speakers: (a) T. Gilbertson, M.I.Prod.E., Works Director, Folland Aircraft Ltd.

(b) a representative of the Ministry of Supply.

The Conference will be summed up from 11.30 a.m. to 12.30 p.m. on Saturday morning by Mr. Walter C. Puckey, a Vice-President of the Institution, who is Deputy Controller of Supplies (Aircraft Production) at the Ministry of Supply.

Members who would like to attend the Conference are invited to make application to the Secretary not later than 10th December, 1952, at 36, Portman Square, London, W.1. The Conference fee of One Guinea includes the Luncheon and other refreshments during the Conference.

Southern Section

The Southern Section, in conjunction with the Southampton Branch of the Royal Aeronautical Society, held a very successful opening Meeting on the 16th October, 1952, when Mr. Harold Povey, of the De Havilland Aircraft Company, presented his lecture on the "Comet," which was illustrated by a large number of slides and a short silent film. Approximately 400 members and guests attended the Meeting.

Left to right.—Mr. F. C. Cooke, President of the Southern Section; Mr. H. Povey, Director of the De Havilland Aircraft Company; Professor E. J. Richards, Professor of Aeronautics at the University of Southampton, and Chairman of the Southampton Branch of the Royal Aeronautical Society; Mr. J. W. Taylor, Honorary Secretary of the Southern Section.

The discussion was opened by Mr. J. W. Taylor, who took the opportunity of announcing Southampton's connection with the "Comet" aircraft, the tailplanes being built by Folland Aircraft Ltd. The discussion was supported by Mr. W. E. W. Petter, Managing Director of Folland Aircraft Ltd., and Mr. F. H. Pollicutt, Chief Designer of the same firm.

On behalf of the two organisations, Professor Richards expressed a vote of thanks to Mr. Povey for his most interesting paper.

Shrewsbury Section—Inaugural Meeting

The Inaugural Meeting of the Shrewsbury Section, which recently attained full Section status, took place on Saturday, 20th September, 1952, at the Walker Hall, Shrewsbury. Among the guests were Sir Cecil Weir, President of the Institution, who received a civic welcome from the Deputy Mayor of Shrewsbury (Councillor A. H. Jones), Mr. E. W. Hancock, M.B.E., Member, and Mr. W. F. S. Woodford, Secretary of the Institution.

Attending the Shrewsbury Section Inaugural Meeting were (*left to right*) W. F. S. Woodford, Secretary of the Institution; Sir Cecil Weir, President of the Institution; Mr. H. Bainbridge, Shrewsbury Section President; and Mr. E. W. Hancock, M.B.E., M.I.Prod.E.

Mr. H. Bainbridge, President of the Shrewsbury Section, in his Presidential Address, stressed the vital importance of increasing the number of productive workers in industry. He declared that there was over-employment in the non-productive side of industry, and that there must be a return to frugal and practical methods of management.

Sir Cecil Weir and Mr. Hancock also addressed the meeting, paying tribute to the technical colleges, whose work and co operation were of such great value to the Institution.

I.C.W.A. Summer School

The Third Residential Summer School of the Institute of Cost and Works Accountants was held in Cambridge from 22nd to 27th September, 1952. Subjects and speakers were as follows:

"The Productivity of the Office Worker," by H. A. Simpson, F.C.W.A.

"Office Mechanisation," by H. H. Norcross, F.C.W.A., A.I.Prod.E.

"Budgetary Control," by C. A. Herring, F.C.W.A.

"Electronic Calculating Machines in Industry and Commerce," by B. B. Swann, B.Sc.(Econ.), B.Com.

"Productivity in Theory and Practice," by Graham Hutton, O.B.E., B.Sc.(Econ.).

Speakers at the Dinner held on the last evening included Mr. W. F. Jenkins, C.B., C.B.E., Under-Secretary (Contracts), Ministry of Supply; the President of the Institute, Mr. S. C. Tyrrell; Mr. Roland Dunkerly, J.P., a Past President of the Institute; Sir Graham Cunningham, K.B.E.; and Mr. James Crawford, J.P., President of the National Union of Boot and Shoe Operatives and a member of the General Council of the T.U.C.

Award to Wolverhampton Graduate

The Institution congratulates Mr. R. G. Clark, a member of the Wolverhampton Graduate Section, on receiving the 1952 Sir Percy Mills Award. Mr. Clark gained this award, which is presented by the Institute of Industrial Supervisors, for his essay entitled "The Foreman and Materials Handling."

Gummers Limited Celebration Dinner

On 23rd October, 1952 a Celebration Dinner was held in Sheffield in honour of Mr. W. H. Gummer and Mr. Geo. Gummer, Directors of the firm of Gummers Limited, who have been actively connected with the Company for 50 years. Mr. G. P. Gummer, son of Mr. W. H. Gummer and nephew of Mr. Geo. Gummer, is the Chairman of the Sheffield Graduate Section.

NEWS OF MEMBERS

Mr. F. W. Bates, Associate Member, has taken an appointment as Production Manager of Carron Company, Larbert, Stirlingshire.

Mr. R. Clark, Associate Member, has been appointed Factory Manager of Arthur Berton Ltd., London.

Mr. H. Corthorn, Associate Member, has resigned the Section Hon. Secretaryship of the Preston Section, and has taken an appointment with Leyland Motors (Canada) Ltd., at Longueuil, Quebec.

Mr. A. E. Hamnett, Associate Member, has joined the staff of the Redditch Technical College as an Assistant Lecturer.

Mr. C. E. Hill, Int. Associate Member, is now Chief Jig and Tool Draughtsman with Newman Industries Ltd., Yate.

Mr. R. E. Leakey, Member, Vice-President of the London Section, was recently appointed Works Director of E.M.I. Factories Ltd., Hayes, Middlesex. Prior to this appointment, Mr. Leakey was Works Engineer to the Company.

Mr. W. C. Puckey, Member, who was Chairman of Council for the years 1950/51 and 1951/52, has been elected a Director of the British Tabulating Machine Co. Ltd. Mr. Puckey is Deputy Director of Supplies (Aircraft Production), Ministry of Supply.

Mr. C. W. Roberts, Member, has taken over the management of the Brass Pressure Diecasting Section of Copper & Alloys Ltd., West Bromwich.

Mr. G. A. Symons, Associate Member, has taken up the post of Works Manager with Guild Products of Cincinnati, Ohio.

Mr. H. Teasdale, Member, has taken an appointment with the North Western Gas Board as Training and Education Officer.

Mr. H. Turner, O.B.E., Member, has been appointed Superintendent of the R.N. Torpedo Factory, Alexandria, Dumbartonshire.

Mr. E. D. Cock, Graduate, is now an Assistant Teacher in the Engineering Department of the Wellingborough Technical College.

Mr. B. Hill, Graduate, has joined the Production Engineering Research Association, Melton Mowbray, as an Information Engineer.

Mr. G. H. Newton, Graduate, is now a Methods and Product Engineer with the English Electric Co. Ltd., Stafford, and is attached to the Production and Development Department in the Switchgear Works.

Mr. F. E. Nichols, Graduate, has taken an appointment as Manager with D. M. Mann & Co. Ltd., Eye, Suffolk.

Mr. W. T. Tory, Graduate, is now a Technical Cost Estimator with The Brush Electrical Engineering Co. Ltd., Loughborough.

Mr. A. E. Veness, Graduate, is now a Production Engineer with Carters (J. & A.) Ltd., Acton, N.W.10.

Mr. D. A. L. West, Graduate, has been appointed Engineer III at the Engineering Test Laboratory of the Fighting Vehicles Design Establishment, Ministry of Supply.

Mr. E. Willcox, Graduate, is now Production Manager of Ellis Son & Paramore Ltd., Sheffield.

Visitor from Abroad

Mr. C. J. Clarke, Associate Member, of the Adelaide Section, is visiting England, the U.S.A. and Canada on behalf of his Company. Mr. Clarke is Chief Engineer of Tecalemit (Australasia) Pty. Ltd., and the purpose of his trip is to investigate certain projects.

Obituary

The Institution deeply regrets to record the deaths of Mr. H. Bullock, Member, of the Luton Section and Mr. James F. Driver, D.L.C.(Hons.), M.I.E.E., M.I.Mech.E., M.I.Brit.F., Editor of Machinery Lloyd.

Mr. Bullock was a Founder Member of the Institution, and had been a member of the Luton Section Committee since 1924. His wise counsel and active interest will be greatly missed.

Mr. Driver, a good friend of the Institution, was the first Works Manager and Head of the Electrical Engineering Department, Loughborough College, which he left to become Editor of Machinery Lloyd fifteen years ago. He was also a member of the Board of Directors.

British Standards

The following British Standards have recently been issued and may be obtained, post free, from the British Standards Institution, 24-28, Victoria Street, Westminster, London, S.W.1:—

B.S. 731: Part I: 1952 Flexible Steel Conduit and Adaptors for the Protection of Electric Cable. (2/6).

B.S.1889: 1952 Dimensions of Foundry Moulding Boxes. (2/6).

HAZLETON MEMORIAL LIBRARY

It would be helpful if, in addition to the title, the author's name and the classification number could be quoted when borrowing books.

Note :—

Members are asked to note that the Library will be open between 10 a.m. and 5.30 p.m. from Monday to Friday each week, and from 9.30 a.m. to 12.30 p.m. on Saturdays. Due to Meetings, the full facilities will not be available at the following times:—

Monday, 1st December, from 2.30 p.m.
Thursday, 11th December, all day.
Tuesday, 16th December, from 11 a.m.
Tuesday, 30th December, from 12 noon.

REVIEWS

621.791 WELDING, CUTTING

" The Welding of Non-ferrous Metals " by E. G. West. *Chapman & Hall, London.* 1951. 553 *pages. Illustrated. Diagrams.* £2 15s.

This book by Dr. West is an up-to-date and authoritative review of welding and cutting practice on non-ferrous metals, and covers both the operational side for welding engineers, welding operators, etc. and the designers and equipment users in the form of designers, works engineers, and metallurgists.

Whilst no book can substitute for practical experience in these fields, it will be found that this book is indispensable as a background of knowledge in the welding and cutting of non-ferrous metals.

M.S.

621.791 WELDING, CUTTING

" Oxygen Cutting " by G. V. Slottman and E. H. Roper. *McGraw-Hill, N.Y.* 1951. 407 *pages. Illustrated. Diagrams.* £2 15s. 6d.

This book provides a very full analysis of the techniques of gas cutting. Whilst individual interpretations of some of the finer technical points may vary from country to country, the substance of this book represents an authoritative world view on techniques in this field.

All sections, including some of the latest developments in hand scarfing and machine scarfing practice have adequate treatment, and the book is extremely useful in collecting and expounding much data and theory which has previously had to be sought through the many journals of Scientific Societies.

M.S.

532.5 FLUID MOTION:, HYDRAULICS

" Pipe Resistance for Hydraulic, Lubricating and Fuel Oils, and other Non-aqueous Liquids " by T. E. Beacham. *Spon, London.* 1951. 61 *pages. Diagrams.* 18s.

Calculations involved in determining the resistance to fluid flow offered by the inside wall of a pipe are normally both long and tedious.

This book, therefore, should prove itself useful to designers who are concerned with the flow of fluids along piping. The author is well known as an authority on hydraulics and in this book he has provided methods, which are easy to apply, for estimating the resistance of pipes to the flow of non-aqueous liquids.

To this end, the main content of the book is a series of pipe-friction diagrams which the author has prepared to provide a reasonably accurate result in a minimum of time. Various pipe materials are covered by the diagrams which cater for fluids with a wide range of viscosities which are quoted in Redwood No. 1 seconds. The range extends from 10,000 to 30 Redwood, and the approximate equivalent values in Saybolt and Centistokes quoted.

R.H.

519.2 STATISTICS

" Technological Applications of Statistics " by L. H. C. Tippett. *Williams & Norgate, London; Wiley, N.Y.* 1952. 189 *pages. Charts.* 18s.

This book is based on a series of lectures given at the Massachusetts Institute of Technology by the author, who is Statistician to the British Cotton Industry Research Association. It is in two parts, the first of which deals with the practical application of Quality Control, and the second with Investigation and Experiment.

The author makes it clear that the production of charts and the calculation of statistics are tools for the control of production and not ends in themselves.

Various methods for different purposes are shown and practical examples are given for dealing with a variety of problems and from many different industries.

The second section goes more deeply into the theory of sampling and the production of statistics, and shows how to carry out experiments to determine the proper method to apply in a particular case.

The book provides a useful summary and explanation for anyone wishing to set up a Quality Control system. A comprehensive bibliography as a guide to further reading is included.

R.M.E.

621.81 MACHINE DESIGN

"Maschinenelemente" by W. Tochtermann. *6te . . . neubearb. Aufl. Berlin. Springer-Verlag.* 1951. 515 *pages. Illustrated. Diagrams.* £3

This profusely illustrated volume of over 500 pages in German is a combination of text-book and reference book on machine design and theory of machines. The subject is sub-divided functionally and although some often-used machine elements are omitted, those that are dealt with are covered thoroughly. The individual sections deal with fastenings, i.e. welds, rivets, screws, shrink fits, etc., machine elements for rotational motion, and for the transmission of such motion, elements for the conversion of various motions, and elements relevant to the transmission of liquids, gases and steam.

The text is supplemented by over 600 clear line illustrations and photographs.

J.C.Z.M.

744 TECHNICAL DRAWING

"Technical Sketching" by E. F. Waller. *Pitman, London.* 1951. 60 *pages. Illustrated.* 6s. 6d.

The author brings to light a weakness of many designers and draughtsmen, that of making a good sketch prior to finished drawings. The layout of the book is such that a student can start from straightforward simple sketches and progressively develop to isometric views of complicated machinery and mechanisms.

E.A.H.

669. METALS; METALLURGY

"Behaviour of Engineering Metals" by H. W. Gillett. *Wiley, N.Y. Chapman & Hall, London.* 1951. 395 *pages. Illustrated. Diagrams.* £2 12s.

This book, as the title indicates, is concerned with the behaviour of metals and alloys in production, fabrication and service. Although a number of metallurgical principles and practices are outlined, this book is primarily intended for those engaged in the selection and use of metals and alloys for engineering purposes, rather than for metallurgists.

The first chapters briefly cover the general mechanical and metallurgical approach to the selection and use of metals and alloys and deal with such subjects as Specifications, Metallurgical Terms, Design, Testing, Chemical and Physical Properties, etc.

This section is followed by descriptions of various types of steels and cast iron, their production, properties and heat treatment, cold working and general usage.

The reader is then given a survey of ferrous and non-ferrous castings and casting practice, followed by three chapters on wrought, non-ferrous and precious metals.

The remainder of the book covers a wide variety of subjects difficult to classify, but all of which have a direct bearing on the selection and use of metals and alloys. Such subjects as Machinability, Clad and Coated Materials, Chemical Treatments. Plating, Cleaning, Corrosion, High Temperature Service, etc., are dealt with in some detail.

Useful Bibliographies are given at the end of each chapter.

T.R.K.

ABSTRACTS

331.1 **PERSONNEL MANAGEMENT; EMPLOYER-EMPLOYEE RELATIONS**

"Training and Promotion in Nationalised Industry" by Acton Society Trust. *Allen & Unwin, London.* 1951. 138 *pages.* 10s. 6d.

The subject matter of this book is based on the researches of the staff of the Action Society Trust and gives information on training and promotion in the basic industries of Coal, Transport, Electricity and Gas. In each section the subject is dealt with under the headings of Vocational Training; Supervisory Training; Management Training, and Industrial Education. The structure of each industry is outlined and the function of training and avenues of promotion are related to the organisation and physical distribution of the industry concerned.

In the concluding observations attention is given to specific problems, such as size and uniformity of practice, which appear to warrant special consideration.

669.356 **BRONZE**

"Chill-Cast Tin Bronzes" by D. Hanson and W. T. Pell-Walpole. *Arnold, London.* 1951. 368 *pages. Illustrated. Diagrams.* £3 15s.

This book confines itself to casting in metal moulds and does not touch upon sand casting, except in Chapter I which gives a comprehensive history of the use of bronze throughout the ages. The following chapters deal with the assessment of quality in cast bronzes, melting methods, recommended melting procedures and chill-casting practice.

Three chapters deal with modern research on melting and casting techniques, and a further five chapters dealing with constitution, segregation, properties, impurities and heat treatment of cast bronzes, are intended as reference works on their respective subjects, and include some previously unpublished work by the authors. A final chapter in this category covers wrought bronzes.

The bibliographies at the end of each chapter include the most useful publications up to 1948. A brief list of the most important publications on bronze since then is given at the end of the book.

347.7 **COMMERCIAL AND INDUSTRIAL LAW**

"Your Factory and the Law" by Francis W. Hunt. *Seven Oaks Press, London.* 1951. 156 *pages.* 15s.

In this book, Mr. Hunt, a former Superintending Factory Inspector, sets out to explain the Factories Act and the Statutory Orders and Welfare Orders relating to factories, in terms more understandable to those who are not acquainted with legal phraseology, than the actual Acts.

After explaining the meaning of "Factory" in the sense of the Factories Act, he discusses questions relating to factory structures and factory amenities, e.g. air space, sanitary accommodation, clothing accommodation, etc.

Reference is then made to cleanliness, temperature, ventilation and lighting, after which the author briefly deals with various health provisions, e.g. weight lifting, infectious diseases, etc., and the prohibitions relating to certain dangerous materials and processes.

Only three, however, out of seventeen chapters are devoted to safety provisions, infringements of which practically monopolise prosecutions made under the provisions of the Factories Act, and which are of outstanding importance to Production Engineers and Managers.

Chapters on employment provisions for Women and Young Persons, the applications of the Act to Docks and Wharves, Building Operations and the like, the position of owners and occupiers of tenement factories, piece-work rates and various administrative matters, conclude the author's treatment of Statute Law, as applied to factories.

658. INDUSTRIAL ORGANISATION; MANAGEMENT

"Textile Organisation and Production" by A. E. Clifford. *Carter Publications Ltd., Belfast.* 1951. 93 *pages. Diagrams.* 25s.

This book commences by dealing with the various types of Organisation, the Principles of Management and the Duties of Supervising Staff.

Chapters follow on Budgets, the Planning and Control of Production and the Control of Materials and Quality.

The evaluation of work and incentives receives attention as does also the question of manufacturing costs, and to complete the book Layout and Maintenance of Plant and the Personnel Department are dealt with.

A picture of industrial methods applied to textiles is given and illustrated throughout by diagrams and tables, and an index and a bibliography are included.

PAPERS RECEIVED

1898 **"The Practical Engineering Approach to Interchangeability of Manufactured Components"** by Professor O. Kienzle.
1899 **"The Control of Quality on Mass Production Engineering Parts"** by J. Loxham.
1900 **"X-Rays in Industry"** by R. J. Wright.
1901 **"Optical Instruments Applied to Precision Measurement in Engineering"** by J. W. Harrison.
1902 **"Fuel Design for Economy"** by D. H. Hayes.
1903 **"The Nature of Tungsten Carbide"** by Lawrence K. Lord.
1908 **"The Technique of Carbide Tooling"** by Lawrence K. Lord.
1904 **"The Organisation and Subsidiary Activities of the Indian Mints"** by Major D. V. Deane.
1905 **"Precision with Production"** by G. H. Clements.
1906 **"The Design and Development of the Twin Centaurus Power Plant for the Brabazon"** by J. L. Norton.

OTHER ADDITIONS

331.11 SELECTING AND ENGAGING STAFF

National Institute of Industrial Psychology, London. **"Studying Work for Vocational Guidance and Selection."** *Lond., The Institute.* [1951.] 21 *pages.*

331.5 SPECIAL TYPES OF WORKERS

Industrial Welfare Society, Inc., London. **"The Elderly Worker: Suggestions towards an Employment Policy, based on a Survey conducted by the I.W.S."** *Lond., The Society.* 1951. 14 *pages.* 1/-.

374.2 STUDY GROUPS

National Institute of Industrial Psychology, London. **"Conference Leading."** [by E. C. Livingstone.] *Lond., The Institute.* 1952. 27 *pages.*

531.383 GYROSCOPES

Sperry Gyroscope Company Ltd., Brentford, Middx. **"The Gyroscope through the Ages."** *Brentford, The Company.* 1952. 43 *pages. Illustrated.*

538. MAGNETISM; ELECTROMAGNETISM

General Electric, Pittsfield, Mass. **"Permanent Magnet: Design Manual."** *Pittsfield, The Company; New York, Internat. Nickel Co.* [1949.] 38 *pages. Illustrated. Diagrams.*

553.8 DIAMONDS; DIAMOND TOOLS

Industrial Diamond Trade Names Index 1951-52. **Compiled jointly by Industrial Diamond Information Bureau and Industrial Diamond Review.** *Lond., N.A.G. Press Ltd.*

607. RESEARCH

Great Britain—Mechanical Engineering Research Board. **"Mechanical Engineering Research 1947-1950."** *Lond., H.M.S.O.* 1951. 39 *pages. Illustrated.* 2/6.

620.1 ENGINEERING MATERIALS

Hill, F. T. **"Materials of Aircraft Construction."** (6th Ed.). *Lond., Pitman,* 1946. 471 *pages. Illustrated. Diagrams. Charts.*

621.1 STEAM POWER

Lyle, Oliver. **"Efficient Use of Steam; written for the Fuel Efficiency Committee of the Ministry of Fuel and Power."** *Lond., H.M.S.O.* 1947. 912 *pages. Illustrated. Diagrams.* £1 2s. 6d.

621.357 ELECTRODEPOSITION; ELECTROPLATING; ELECTROFORMING

Great Britain—Ministry of Supply—Armament Research Department. **"Method of Repair of Worn or Overmachined Steel Components by Electrodeposition of Nickel."** *New York, International Nickel Co.* 1944. 24 *pages.*

621.74 FOUNDRY WORK

Aluminium Company of America, Pittsburgh, Pa. **"Designing for Alcoa Die Castings."** *Pittsburgh, The Company.* 1948. 188 *pages. Diagrams.*

621.78 HEAT TREATMENT

International Nickel Co., Inc., New York. **"Case Hardening of Nickel Alloy Steels."** *New York, The Company.* 1946. 35 *pages. Graphs.*

International Nickel Co., Inc., New York. **"Quenching and Tempering of Nickel Alloy Steels."** *New York, The Company.* 1947. 26 *pages. Illustrated. Graphs.*

621.791 WELDING, CUTTING

Great Britain—Advisory Service on Welding. **"Memorandum on the Resistance Welding Processes."** *Lond., H.M.S.O.* 1946. 54 *pages. Illustrated. Diagrams.* 2/-. (Welding Memorandum No. 4C.)

Quasi-Arc Company Ltd., Bilston, Staffs. **"Instruction Book for Electric Arc Welders."** *Bilston, The Company.* 1952. 68 *pages. Illustrated. Diagrams.* 2/6.

Steel Founders' Society of America, Cleveland, Ohio. **"Recommended Practice for the Welding of Steel Castings."** *Cleveland, The Society.* 1951. 40 *pages. Diagrams.* 35c.

621.794 SURFACE TREATMENT OF METALS

Shaw, R. E. **"Phosphate Treatment of Wearing Parts of Machinery."** *Slough, I.C.I. Paints Division.* 1947. 35 *pages. Illustrated.* (Institute of Marine Engineers—Transactions 59: No. 2, pp. 25-34.)

621.822 BEARINGS

British Timken Ltd., Birmingham. **"Engineering Applications of Tapered Roller Bearings."** *Birmingham, The Firm* [n.d.] *Looseleaf. Diagrams.*

621.83 GEARS

National Broach and Machine Company, Detroit. **"Red Ring Gear Finishing Machine: Operators' Handbook."** *Detroit, The Company.* [n.d.] 39 *pages. Illustrated. Diagrams.*

Journal Binders

Members are reminded that binding cases for the Journal are obtainable from Head Office, price 7/6 each post free. The cases, each of which will hold 12 issues of the Journal, are made of stiff board covered with imitation leather cloth, with gilt lettering on the spine.

Research Publications

A number of copies of the following Research publications are still available to members, at the prices stated:

Report on Surface Finish, by Dr. G. Schlesinger	15/6
Machine Tool Research & Development	10/6
Practical Drilling Tests	21/-
Test Charts for Machine Tools, Parts 1, 2, 3, 4	6/- each

These publications may be obtained from the Production Engineering Research Association, "Staveley Lodge," Melton Mowbray, Leics.

Issue of Journal

Owing to the fact that output has to be adjusted to meet requirements, and in order to avoid carrying heavy stocks, it has been decided that the Journal will only be issued to new Members from the date they join the Institution.

Important

In order that the Journal may be despatched on time, it is essential that copy should reach the Head Office of the Institution not later than 40 days prior to the date of issue, which is the first of each month.

LONDON GRADUATE WEEKEND SCHOOL

LONDON Graduate Weekend Schools appear to have become an annual event. The third Weekend School took place at the Beatrice Webb House in Surrey on 3rd/5th October, 1952, and, like its predecessors, was well attended.

Mr. R. Kirchner, President of the London Section, took the Chair, and the guests included Mr. H. Peter Jost, Associate Member; Mr. S. Caselton, Assistant Secretary (Administration) and Mr. G. E. Knight, Assistant Secretary (Education and Membership), of Head Office staff.

Machining Research

The proceedings were opened by a lecture by Mr. Peter Spear, B.Eng., Grad.I.Prod.E., Director of Research at Rubery, Owen Ltd. Mr. Spear spoke on " Machining Research " and fostered an animated discussion centering mainly around the gap between research laboratory and shop floor, and some interesting suggestions to bridge this gap were made.

Quality Control

Mr. E. D. van Rest, M.A., B.Sc., F.Inst.P., of the National Physical Laboratory, followed with his lecture on " Quality Control," the main part of which was devoted to an outline of the organisation necessary to ensure effective control of quality. Many quality control schemes had not come up to the expectations of the companies introducing them, because in many cases the *method* only, without the necessary organisation, had been provided.

The essential requirements and constituent parts of such organisation were then outlined by Mr. van Rest, who concluded with an outline of the bases of some statistical methods used in modern statistical quality control.

Technique of Industrial Investigation

Mr. John Leigh, B.Sc., M.I.I.A., A.M.I.Mech.E., F.R.E.S., of Urwick, Orr & Partners, Ltd., in his lecture on the technique of industrial investigation, gave the School the benefit of his many years of experience as a Consultant. Differentiating between scientific research and industrial *ad hoc* investigation, Mr. Leigh proceeded to outline some reasons for the unsatisfactory results of the latter, which he defined as the getting and reporting of all information necessary to enable and assist management in making the right decision in particular circumstances.

The main part of his lecture consisted of an exposition of the steps necessary in *ad hoc* investigation and of the pitfalls to avoid. His discourse, which was followed by a lively discussion, was felt to benefit his audience to a very considerable extent.

The Production Engineer's Responsibility to the Community

A short paper by Mr. T. B. Worth, Education Officer, read in his absence by Mr. D. I. Jerrard, was followed by undoubtedly the most serious discussion of the School. General agreement was expressed that a high standard of performance, whilst of primary importance, was by no means the only duty of a professional Production Engineer towards the community.

Recognised professional integrity was considered essential and the need for a code of ethics was expressed. It was realised that the community owed no duty to production engineering unless the profession first *earned* such duty, by the collective and individual efforts of Production Engineers. Official recognition had to be preceded by public trust in the profession, and hope was expressed that guidance from the Institution might be forthcoming on any individual or collective action in this direction.

Halifax Graduate Weekend School

The Institution congratulates the Halifax Graduate Section on their successful Weekend School—the first organised by the Section—which was held on 6th and 7th September, 1952, at Craiglands Hydro, Ilkley.

The Chairman was Mr. R. S. Cracknell, Chairman of the Graduate Section Committee, and among those present were Dr. Walker, of the Halifax Municipal Technical College, and Mr. T. B. Worth, the Institution's Education Officer. The School was also pleased to welcome two members of the Yorkshire Graduate Section.

The proceedings opened with a discussion on the following four questions:

1. What, in the opinion of the School, was the most suitable definition of the functions of a Production Engineer?
2. Would the members of the School express their ideas as to the responsibility of the Production Engineer to Management?
3. Did the members of the School think that the Production Engineer had any responsibility towards labour?
4. How would the members present incorporate a Production Engineer into the general theme of Management structure?

A photograph taken during the Halifax Graduate Section Weekend School. Included are (*centre front*) Mr. T. B. Worth, Mr. R. S. Cracknell, and Dr. Walker.

This was followed in the evening by an informal discussion on "The Responsibility of the Production Engineer to the Community as a Whole," and the final Session took the form of a test case set by the Chairman, in which members of the School were invited to reorganise a firm which had outgrown its usefulness in its existing form.

It was generally agreed by those attending that the School had served a valuable purpose in providing facilities for the interchange of ideas and opinions, and it was hoped that the experiment would be repeated.

MODERN TRENDS IN THE SELECTION OF STEELS

by G. M. FLATHER*

Presented to the Sheffield Section of the Institution, 8th October, 1951

THE selection of a steel implies that there are a number of steels from which to choose. Although there are many different chemical compositions available, the requirements of a specialised item always limit the choice to a certain grade of steel, e.g. direct hardening or case hardening variety. There are many factors which must be considered in the selection of a steel to be used for a part in a structure or machine; the principal ones are, of course, reliability and economy.

Reliability depends largely on the mechanical properties that will meet general requirements in service and these depend, in turn, on the composition, heat treatment, hardenability and many other factors. Reliability also depends on quality, which depends on the control of a number of factors in manufacture and processing.

Economy depends on the initial cost which is influenced by chemical composition, method of manufacture and the amount of processing. All these costs, although important, are now overshadowed by another very important aspect, namely the ease or difficulty of fabricating a part by machining; in other words the machining characteristics of the material.

From the foregoing it is evident that the selection of the best and most economical steel for any specific engineering purpose is exceedingly complex, and many considerations are involved which must be co-related skilfully if the best results are to be obtained.

In this paper it is proposed to comment on some of the general points mentioned in reliability and economy, rather than give specific examples of steel selection.

Mechanical Properties

It is essential that the steel for any application should possess certain mechanical properties which will meet the service requirements of the article or component. The properties usually specified are hardness, yield strength, tensile strength, elongation, reduction of area and

* Master Cutler, 1951; Joint Managing Director, W. T. Flather & Co., Ltd., Sheffield.

impact; all these can be varied by altering the chemical composition of the material and the heat treatment it is subjected to prior to service.

Whilst these two things are separate, they must be blended carefully if satisfaction is to be obtained.

A wide variation in mechanical properties is obtained in steel because steel is essentially a mixture, consisting of 90/98 per cent iron, from .06/1 per cent carbon, the remainder are usually alloying elements with the exception of sulphur and phosphorus, which are present as impurities.

Pure iron is soft and ductile, but on increasing the carbon content the steel becomes increasingly hard at the expense of ductility which decreases in proportion.

Alloying elements are used further to increase the strength of steel and, as we all know, if the component is small in section it can usually be produced in plain carbon steel, suitably heat treated to give a tonnage of, say, 45 tons, but if it is large in section, alloying elements such as nickel and chrome must be used to give an equivalent tonnage. The importance of the careful blending of the chemical composition in light of subsequent heat treatment cannot be over-emphasised.

Too high a carbon content associated with addition of nickel and chromium will cause grave risk of cracked material during heat treatment.

Fig. 1 illustrates a typical hardening crack which developed in sound material during hardening. The material is En.16. The carbon and molybdenum were on the top side of the specification and the manganese well over the top limit.

Thus, without going into a complete metallurgical explanation, there must always be the correct " balance " between the various elements concerned if reliable results are to be obtained.

Fig. 1.
Hardening crack caused by combination of chemical composition and quenching rate.

Interpretation of Results

Assuming that the desired mechanical properties can be achieved, the interpretation of the results is just as important as the actual mechanical factors. All too often the designer sets certain limits of acceptance of the steel parts he is going to build into something to serve a definite purpose, his purpose being to secure both amenability to processing and freedom from failure in the final " something." He tries to accomplish this by writing a specification and a definite specification demands that the product delivered must pass certain tests. All too seldom the specified tests really measure the properties truly needed for successful service. Far more often, they represent some few properties determined by some conventional tests on material that has been used before and found to perform satisfactorily. The designer simply wants more like it and is not concerned with how much cost he could avoid, how much weight he could save, or what other improvement could possibly be effected if another material were chosen, another set of specifications drawn, or design modification made to allow the use of another material with different properties.

It is imperative that the ultimate use must be considered before selecting tests for the valuation of suitability and, although this is becoming more widely understood and many special tests are being made to evaluate properties, there are still a great many people who deceive themselves into thinking that the conventional tests are the true service requirements when they are not, or if they do recognise that they are not, it is often assumed that unmeasured properties will be achieved automatically with similarity to those that are measured. This, of course, can lead to failure. Perhaps two stories will help to emphasise this point.

The first concerns a Ford crankshaft: at one time the crankshafts were made from forged steel and high ductility and high impact resistance were specified and insisted upon, really because these properties were characteristic of the forged steels after proper treatment. Unfortunately, the designer was inclined to feel that the toughness specifications were imposed in order to avoid the shattering failure of the crankshafts. He closed his eyes to the fact that a bent crankshaft means a ruined engine, just as much as a broken one does, so the insurance was false. Finally, after experiments with bent crankshafts which had led to increasing the section and stiffness of the forged material, the Ford designer sensed that the service demanded stiffness, fatigue and wear resistance; it did not involve impact nor could it use ability of deformation. By eradicating the unnecessary requirements and imposing only those needed, they developed and applied cast material which was successful but which had almost zero ductility and zero notched bar impact resistance.

The study of an aluminium alloy aircraft wing constructed during the war, showed that 1½ per cent elongation utilised as permanent deformation was excessive and was sufficient to ruin the aerodynamic efficiency of the wing. Yet the specification for all material in this assembly laid down that elongation inherent in the material should be 10/14 per cent but this, from the results of this research, can never be utilised for service on this wing.

As we all know, glass is fragile and consequently we use it with care. The story goes that a man was always in the habit of breaking his spectacle frames and in disgust and despair, ordered his next pair ground to his prescription in stainless steel. This was carried out, but the glasses, although they did not break, were not very serviceable. Such points of view, although they seem ridiculous, do emphasise the importance of the selection of mechanical properties and any specification which has been based on the principle of likeness to something used before, rather than on actual service requirements, must be viewed with caution.

This may leave one in doubt if mechanical properties have any bearing at all, but you can be assured that they are most important, although to obtain the best results they must be interpreted correctly. The designer must know the hardness of the material and on this will depend whether the component wears or whether it will be worn. He must know the tensile strength of the material and it is very important for him to know either the yield strength or the endurance limit.

Impact Value

In almost all specifications an impact value is called for which is not given in tons per square inch but is given in ft. lbs. energy absorbed and, as such, whilst it has no direct application to design, it is used purely as a qualitative index of toughness. Unfortunately, these results can give very erroneous information and must be treated with extreme care.

It has been found that many materials which are almost glass brittle under impact in the presence of a sharp notch, act tough when they are formed with fillets of reasonably large radius such as good engineering design always calls for. The impact test does indicate the notch sensitivity of the material and, if the material has been produced to a regular specification over a period of time and suddenly the impact falls below the usual figure, this calls for investigation by a metallurgist. But a low impact figure does not necessarily mean that the material is faulty and useless.

It is also worthy of note that a change in testing temperature may radically alter the results, and steels which show uniform impact at normal temperatures may show brittle fractures when given sub-normal temperatures. A great deal of work has been

and is being carried out on this project due to the wide application of this theory in such problems as ships' plates for ice breakers, aircraft, nuts and bolts, etc.

Fig. 2 illustrates the fall-off in impact with decreasing temperature. The steel tested is ordinary mild steel normalised at 1600° F., that is 880° C., and cooled in air, then tested at various temperatures. The arrows indicate where distinct evidence of crystallinity appears in fracture.

It is also very important to realise that the notched bar impact test bears no relation to the notched fatigue test, and it is the latter in which we are most interested.

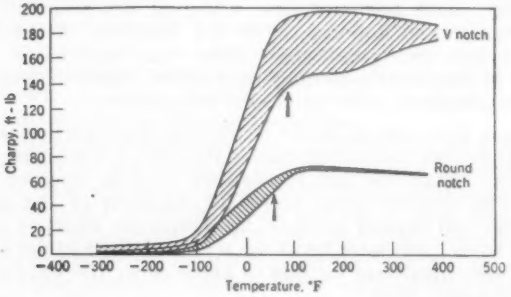


Fig. 2.
V notch versus round notch on a soft normalised steel to illustrate temperature effect on impact values.

Fatigue Testing

The modern trend in the selection of steel is obviously to try, in testing, to reproduce as near as possible the service conditions of the component, and to this end it is felt that fatigue testing bears a very important influence on the successful service or otherwise of any material. All component assemblies are subjected to fatigue in one way or another and an assessment for fatigue value of material would appear to be of much more use to the designing engineer than some of the usual and accepted production tests. This development has very far reaching effects in that production can, at times, be tremendously affected and as much as 250 per cent increase obtained by an accurate assessment of mechanical properties and conditions of service, rather than by abiding by conventional tests. It can often happen that to fulfil the conventional mechanical test requirements, the producer of the steel has to sacrifice some of its inherently good machining characteristics. This, however, will be discussed in greater detail later.

We have now seen how the blending of chemical composition and, if necessary, heat treatment can produce the results desired. Reliability also depends on quality and to obtain the best results variables in manufacture must be controlled.

Steelmaking was established in this country very many years ago as an art and, so far, science has been trying to catch up with this art. Rapid progress has been made in the last fifty years which has made it possible to control variables that hitherto could ruin steel.

With the ever increasing control that can be exerted on these variables during manufacture and subsequent processing, the reproducibility of results has improved and, whereas previously some of the routine tests were carried out for the benefit of the metallurgist to assess the quality of steel production, some of these are now beginning to be superseded by other tests because of the advancement in control that has occurred. Again, the need for knowing the true mechanical requirements of any component is very necessary, as this has a direct bearing on how the steel is produced and the quality required.

It has been found that certain ranges of material, although they can be processed satisfactorily in order to eradicate superficial surface defects which occur in the ingot, the material must be turned, which again adds up the cost, and it is usually found that if the whole problem is assessed the mechanical requirements

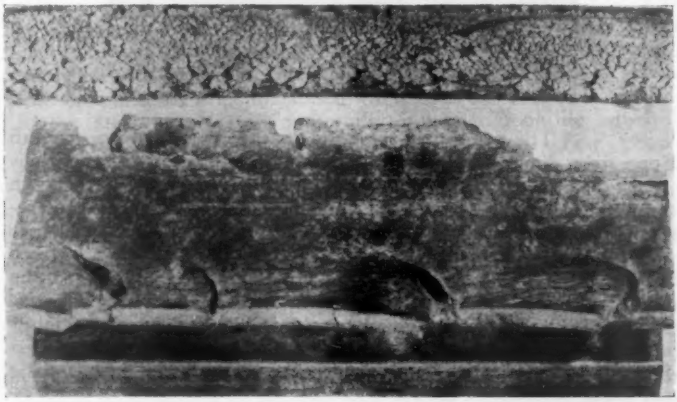


Fig. 3.
Edge of slab showing hot shortness due to critical rolling range and lower effect of .92 per cent Cu., .10 per cent Sn.

can be modified, so permitting the chemical composition to be altered and thus getting out of the range which proves so troublesome to the steelmaker. This is a very important point which many do not fully appreciate and is illustrated by Figs. 3 and 4.

Fig. 3 shows the effect of rolling dead soft steel within critical range, and the lower photograph the effect of high proportion of residual copper and tin picked up in scrap. In this case, copper was .92 per cent and tin .10 per cent.

Fig. 4 shows recurrent lapping on surface of ingot caused by alloy additions chilling steel and making it too sluggish, resulting in far too slow a teeming rate.

Fig. 4.
Killed steel ingot showing recurrent teeming lap.

Economy

The economy, as stated in the introduction, depends on the initial cost and this initial cost is influenced by chemical composition. It will suffice to say that with the price of ferro-molybdenum, ferro-nickel, ferro-vanadium, ferro-manganese, ferro-silicon, etc., at so much per lb., it is not hard to realise how the price soon mounts when alloying elements have to be introduced into the material. Unfortunately, to add to the price, it should be realised that certain of these alloying elements, although expensive in themselves, when utilised in steel manufacture will not give 100 per cent yield and, in some cases, the best that can be hoped for is 60/65 per cent, which further increases the cost of the material.

The method of manufacture also influences the cost; unfortunately, in this country electricity is relatively expensive, and this has a direct bearing on the price of steel produced from an electric

furnace. Although producing steel by the basic furnace is not cheap, it is certainly more economical than the electric process with regard to the cost of heat units per ton of steel produced.

Again, many people specify electric furnace quality material because, being the dearest, it will be the best and the purest. Although the first part of the statement is true, I had personal experience some time ago when, to a very distinguished audience of steel manufacturers, sulphur prints and micro sections showing the inherent quality of steel made by the basic open hearth furnace, the electric furnace and the acid Bessemer furnace were shown. It was found that 50 per cent could not differentiate correctly between the three qualities as to which process had been used, and of the 50 per cent who did assess on the merits of the evidence 75 per cent were wrong. This again shows the necessity for careful selection, depending on the type of material required and the ultimate end use.

Price of Manufacture

The most important aspect with regard to cost, however, is not the initial cost but the cost price of manufacture. Labour is not only a very scarce, but a very dear commodity today and anything which can be done to improve production has a material effect on the cost of the finished article.

In the last fifteen to twenty years, steels possessing free machining characteristics have been gradually gaining more favour over the older and more well-known types. The question is often asked: "What is a free cutting steel and how does it function?" Free cutting steels were developed at the request of the engineer, who simply stated that he wanted a steel to possess good fabricating qualities with regard to machining. It was found, and it still is, that certain steels when machined will tend to tear and be excessively luggy, and these factors materially influence tool life which is reduced. Consequently production is retarded. Few people realise that the advent of free machining steels occurs simultaneously with better control of the furnace in steel production. As you know, steel, no matter how it is made, is contained in a refractory receptacle during manufacture and under certain conditions this refractory substance can be attacked by the steel and so enter into the steel when it is in the liquid state.

Control of the chemical composition of the steel and various other factors materially influence the amount of "pick up" that can be obtained in this way.

Now if the steel is dirty, i.e. if it contains non-metallic matter such as silicates and aluminates, this cannot be eradicated once the steel has solidified. What then happens is that on further processing this steel contains an abnormal amount of these non-metallic

inclusions and it eventually reaches the machinist within the mechanical requirements, chemical composition, etc., specified, but still containing these inclusions. The machinist commences to machine this material and is surprised to find that his tool life has decreased by about 50 per cent. Why? The answer is simple. These non-metallic inclusions are hard and they act almost like a grinding wheel on the tool but, unfortunately, usually grind to the wrong angles rendering good machining impossible. Thus the control of the steel quality has a direct bearing on the ultimate machining characteristics of the material.

Experimentation also proved that, whilst excessive non-metallic formation was bad, if the non-metallics were eliminated to a degree that coincided with good quality steel it did not necessarily follow that the material possessed good machining characteristics. Some primary ideas were that the steel was too tough, in other words, the cohesive force within the crystals was too strong and this caused the trouble. Steps were taken to introduce into the steel, substances which would help break up the strength between the crystals by lying along the planes which separated the crystal boundaries. With this plan in mind some of the first casts of free cutting steel were made and, although they possessed better machining characteristics, the steel was terribly poor in quality and not suitable for the majority of applications. Unfortunately this had a very bad effect on the development of this class of material, as the news soon spread that whilst the material did exhibit free machining characteristics, at the same time it possessed no redeeming mechanical features, and was consequently blacklisted by a great many people.

Two Trends of Thought

Experimentation, however, continued and the metallurgists' assessment of this problem was now divided into two definite trends of thought:—

(1) irrespective of chemical composition, uniform machining characteristics could only be obtained if the material in itself was uniform;

(2) to obtain the necessary chip formation and tool life, something would have to be done to improve chip formation and also eradicate lugginess and tearing, which always accompanies poor machining.

The first part of the problem indicated that if the steel making technique was standardised, and also the rolling, this would give a product which would be capable of reproducing the desired results. It therefore became imperative that steel made to possess free machining characteristics was a special steel, which had to have adequate technical control in all stages of manufacture to ensure satisfactory results.

With regard to the problem of improving upon the chip formation and eradicating lugginess, as stated, the presence of iron sulphide was tried but as this formed a hard brittle constituent round the grain boundaries, it was unsuccessful, in view of its deleterious effects on the mechanical properties. Attention now swung to the manganese types of inclusion, namely manganese sulphide, which was known to be plastic and to form globules rather than a network, and eventually it was decided to introduce this type of inclusion and note the results. The first cast of this material with manganese sulphide present was found to be successful, as the steel was exhibiting better machining characteristics whilst still possessing reasonable mechanical features, and it was firmly believed that the sulphides, by forming in globules round the grain boundaries, were doing the necessary work.

Since those days, many developments have been made in this type of steel and when one assesses, by using the microscope, the amount of grain boundaries present, and the amount of sulphide inclusions which are present round these grain boundaries, it is hard to believe how such a conclusion as stated formerly could have been reached. Manganese sulphide is a plastic material and its function would appear to be not so much in breaking up the steel crystals but acting as a lubricant. As such, the sulphides are in intimate contact with the tool which preserves it and consequently the standard of finish can be maintained.

Thus, although the sulphide inclusions play a very important part, their presence is not a panacea for good machining characteristics and, as we all know, even today some steels high in sulphur can give very inferior results when compared with other steels of the same type. The reasons for this performance are sometimes obscure and are still being investigated, but it can be stated that in order to ensure the best results, the manufacture, rolling and subsequent manipulation of the steel generally in all stages must be controlled, otherwise erratic results will follow.

"Natural" Steels

It has often been stated that such and such a person is a "natural" engineer, and the same thing can apply to steel. Some steels can almost naturally possess good machining characteristics which, by careful manipulation, can be emphasised if given the proper treatment. Other steels which are potentially good with regard to machining characteristics, are often ruined by having to process them in different ways in order to meet the specification requirements of the designing engineer.

In this case, we can go right back to the selection of steel and the true assessment of the mechanical requirements. One does not need to look far to sight cases where a steel is specified which has

to have certain mechanical features, such as high elongation and impact values, and at the same time must possess good machining characteristics. Sometimes a steel can be found to meet these demands, but more often than not the best of two worlds cannot be achieved and the result is dissatisfaction to all concerned.

This state of affairs often occurs with the high tensile range of steels; 55 tons tensile, produced and manipulated under carefully controlled conditions, gives a standard set of results with particular regard to mechanical features. Unfortunately, that little bit more is usually required and consequently a specification is drawn up which either places all the mechanical features on the top limit or tries to better some of them. Now, in order to obtain these results, the steel, which we can say is natural in certain ranges, has to a degree to be made unnatural in order to satisfy some of the specification demands, and this is always at the expense of the machining characteristics. In other words, it has to be forced out of "balance" with consequent ill effects.

Many examples could be quoted where components have been pared down to the minimum, in order to save material due to the initial cost and, in order to obtain satisfactory service, it has been deemed necessary to place the mechanical features on the top side of the specification. The material has been produced to the specification and found to be satisfactory but constant complaints were always being made with regard to machining characteristics. Although the material was re-sulphurised to make it free machining, the steel in its unnatural condition would not give the best results. Eventually the design of the component was altered and a thicker section used for this component, which enabled the steel to possess its natural mechanical features and, as a result, the machining characteristics showed up to 250 per cent improvement over previous supplies of the thin section. It is fairly obvious that a distinct saving was made, although the initial cost might be slightly higher.

Free Machining Steels

Free machining steels are new, and specifications drawn up to embody these materials cannot be based on specifications which were drawn up fifty years ago to suit the requirements of that time. Designs have altered radically and a great deal of progress has been made in this direction. It is unfortunately true that whilst all this progress has been made in that direction, sometimes little progress has been made in the development of the steel to suit methods and techniques now used. It is essential that the engineer and the metallurgist get together on this very great problem of steel selection and utilisation, otherwise valuable time can be wasted and a lot of ill-feeling caused.

The range with particular regard to free cutting steels has developed enormously and there is no doubt about it, they are the steels of the future. The application of these steels is a specialised job and if it is treated in this way, some wonderful achievements can and will be obtained.

Fig. 5 illustrates some achievements which have been made where machining time has been drastically reduced, whilst surface finish of component and tool life have actually been improved.

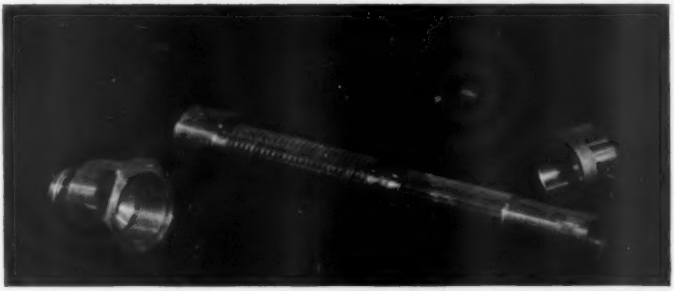


Fig. 5.
Several components which have been produced from steel made to suit customers' specialised requirements.

Conclusion

It will, I hope, be clear from these brief remarks that for successful production, and you are Production Engineers, there is a three-cornered problem to be settled before optimum results are to be expected.

First, the " end use " must be determined together with correct assessment of mechanical properties really necessary for correct working life of the article to be produced. This is the *designer's* job, and he must be educated to give proper consideration to the problem and not simply reach his conclusion by rule of thumb methods originating in days of long ago.

Next, the *Production Engineer* will decide how he would like to make the component and the combined requirements or desires of designer and producer will be placed before the *metallurgist*. With all the information available, he should be able to make selection of a suitable steel which will do the job required of it, and which can be handled by modern high speed machining methods. In other words—team work always pays best.

CORRESPONDENCE

The following comment on the paper published in the October issue of the Journal has been received from Mr. H. Howell, Superintendent of Works Training at The British Tabulating Machine Co. Ltd., Letchworth:—

IT has been said that a function of Art is to sharpen the images and impressions of experience imprecisely perceived by the laity. The introduction of Statistical Methods into Production Engineering may be said to have done much the same for those who spend their working lives with machine tools.

Such men have known that perfection is a conception in infinity, that repeated attempts to approach it with the same device are rewarded with varying degrees of success and atop of that, the devices themselves wear, get fouled and become maladjusted by persistent use over long periods of time. It has taken the Statistician to sharpen our perception of these experiences into the two concepts known respectively as " process inherent variability dispersion " and " assignable causes of variability: or error."

The Statistician has taught us also how to separate the two, measure and express the former so that we may sense the onset of the latter. The tool for doing this is the Control Chart.

It is reasonable, therefore, that some among us should strive towards incorporating the lessons of the Control Chart into the operating mechanisms of the machine tools themselves. At the same time, it becomes less and less difficult for the rest of us to make the mental transition from the concept of individual 100 per cent precision measurement by the machine operator, through Statistical Sampling Quality Control, to the fundamental requirement for control of the machine itself. We have seen the beginnings of the process in the fiducial indicator mounted on the tool feed slides of machines. Another step has been taken by the Solex System of Feed Gauging.

In brief, the Solex System magnifies × 7000 the inherent variability of the human factor in setting machine tool slides. It makes this variability of performance readily visible and readily reduces its dispersion value.

In its present form it does nothing to reduce or reveal to the operator the inherent dispersion of the machine tool itself. This factor would still require the dimensional analysis of a preliminary 10 to 20 parts for its calculation; already familiar in S.Q.C. Still less does it, of itself, reveal the growth of this factor with wear and tear. Again Statistical records are required to reveal this. Lastly,

of itself, the device does not reveal drift of size due to tool- or wheel-wear. Additional measurement with a comparator is required at intervals.

In this case, statistical method has taught us that the measurement of a single piece at intervals is inadequate on account of the presence of inherent dispersion. Therefore, a sampling scheme and Control Chart remain an important part of the method if it is to be relied upon within specified confidence limits. A very serious criticism of a different kind is the limitation of the device in its present form to control of a single dimension.

All these criticisms are offered as a stimulus in the direction towards future improvement and development, for it is the writer's opinion that the device is a healthy machine tool mutation.

Note.—Readers are invited to comment on papers published in The Journal. Correspondence should be addressed to The Editor, at 36, Portman Square, London, W.1.

REPORT OF

THE MEETING OF COUNCIL

Thursday, 30th October, 1952

THE Second Council Meeting of the present Session took place at 36 Portman Square, London, W.1, on Thursday, 30th October, 1952. Mr. Harold Burke, Chairman of Council, presided over the Meeting, which was attended by 26 Members. Also present were Mr. B. H. Jones, Chairman of Liverpool Graduate Section, and Mr. H. J. C. Weighell, Chairman of Luton Graduate Section.

Before proceeding with the business of the Meeting, the Chairman, on behalf of Council, expressed deep appreciation of the donation by Mr. C. E. A. Griffin, Member, of a handsome wall clock for the Council Room.

Finance

The Annual Accounts for 1951/52, and the Report of the Auditors which had been circulated with the Council Papers, were approved. A further £2,000 had been added to the New Building Fund.

The Income and Expenditure Account for the first quarter of the present Session showed a satisfactory position, and that expenditure was running true to budget.

Mr. N. R. Tribble, of the Head Office staff, had been appointed Accountant to the Institution in consequence of his success in passing the final examinations of the Association of Certified and Corporate Accountants.

Annual Dinner, 1952

The Institution's Annual Dinner, which is fully reported on pages 620 to 634, was most successful, and Council expressed their satisfaction with the manner in which this function had been conducted.

Section Meetings

The Secretary, referring to a number of important Section Meetings, reported that the Southern Section were organising a Conference on " Problems of Aircraft Production," to be held in December. (Full details appear on page 585.)

The West Wales Section had arranged a visit to the Trostre Works of the Steel Company of Wales on 29th October, when the Institution's party was led by the President, Sir Cecil Weir.

The first Regional Meeting was held in Wolverhampton on 1st October, 1952, when Mr. F. H. Rolt, O.B.E., presented a shortened version of the 1952 Sir Alfred Herbert Paper. This meeting was very well attended and demonstrated the value of Regional Meetings.

Chairman's Visit to Canada

The Chairman, referring to his recent Canadian visit which was reported in the November issue of the Journal, said that it had been a great pleasure to him to meet the Canadian members.

He had attended three meetings in one week, and when it was realised that several of those attending travelled a hundred miles each way twice during the week, and that one member made the journey three times, it would be gathered that there was certainly no lack of enthusiasm.

Mr. Burke said he was very glad indeed that while visiting the group he had been able to do something towards establishing the movement in Canada. The Section Chairman and Committee had been elected, and there was no doubt that this live body of members was going to make great progress. There was a very wide field for Production Engineers, and the Canadian Section could be relied upon to take advantage of every opportunity for furthering the Institution's activities and the interests of production engineering generally. Already consideration was being given to the formation of a Section in Montreal.

One major difficulty was the serious dearth of facilities for technical education, but Mr. Worth had been asked to give his immediate attention to this problem and Mr. Burke was confident that progress would soon be made in this direction.

Council expressed their gratitude to the Chairman for the work he had done in Canada, and it was agreed that any senior member of the Institution visiting that country should be provided with a letter of introduction to the Chairman or Secretary of the Canadian Section.

Education

The Education Committee were giving active consideration to the Government's new proposals for the future development of Higher Technological Education. Proposals for courses in Production Engineering, of a type likely to find a place in the Government's new plan, were being formulated.

Enrolments were still being received for the Education Discussion Group, the formation of which was announced at the last Council Meeting, and it was hoped to call a preliminary meeting in the Midlands and in London during the first week in November.

The Education Committee had nominated their Chairman, Mr. J. France, to serve on the Board of Governors of the new Institute of Technology, Loughborough College. Other nominations included Mr. L. S. Pitteway to represent the Institution on the Exploratory Committee on Education in Instrument Manufacture, recently set up by the City and Guilds of London Institute ; and Mr. T. B. Worth to continue serving on the Mechanical Engineering Committee of the National Advisory Council for Higher Technological Education.

Membership

Following the last Council Meeting, and in connection with ' broadening the base,' a subcommittee, drawn from both the Membership and Education Committees, had been set up, to carry out a detailed survey of the position, and to recommend policy for the future. In due course the views of Section Committees would be obtained and a report presented to Council.

Mr. R. L. Paice had been re-elected Chairman of the Membership Committee for the 1952/53 Session.

The Journal

The new Editorial Committee, under the chairmanship of Mr. M. Seaman, reported that the Institution Journal had been completely redesigned, and that the first issue in the new form would appear in January, 1953. Before taking this action, the Committee had discussed matters very thoroughly with the printing and advertising contractors, and were satisfied that the new Journal would be an economic proposition.

It was intended that the editorial content of the new Journal should be drawn from the widest possible field, and when necessary, material would be commissioned from individuals of eminence and authority in the production engineering world.

The Papers Committee, under the chairmanship of Mr. W. J. T. Dimmock, were taking vigorous steps to procure first-class papers, not only from Sections, but by promoting meetings and conferences to provide platforms for authoritative speakers on subjects of interest and importance to Production Engineers.

Council adopted the recommendation of the Papers Committee that their Terms of Reference, as suggested in the Report of the Special Committee on Organisation be slightly amended in order to ensure that the work of the Committee might be of the greatest possible value to the Institution.

Research

The Research Committee requested Council to put forward suggestions or comments which might influence future research policy. A number of subjects were already being considered, among them Material

Utilisation, Effectiveness of Tooling, Quality Control and Transfer Processes, but Council's opinion would be valued by the Committee.

Sir Lionel Kearns, C.B.E., had been re-elected Chairman of the Committee for 1952/53.

Materials Handling

The Memorandum on Materials Handling Practice was now in final draft form, and publication early in 1953 was anticipated.

The Sub-Committee dealing with the preparation of Case Studies, in collaboration with the Anglo-American Council on Productivity, had now completed their work, and this publication would be issued early in 1953.

The Materials Handling Sub-Committee were now investigating the educational aspects of the subject, with the assistance of Mr. Worth, and as a first step were preparing a Materials Handling Syllabus for recommendation to technical colleges.

Measurement of Productivity

The Joint Committee of the Institution of Production Engineers and the Institute of Cost & Works Accountants had published their Third Report, " Measurement of Productivity —Work Study Application and Training." This had attracted widespread publicity and already a second impression was being printed in response to heavy demand.

Council were interested to learn that permission to reprint the Report in their own languages had been sought by the appropriate French and German organisations. In addition the British Standards Institution were setting up a committee to deal with work study terminology, thus implementing one of the recommendations made in the Report.

Standardisation

The Committee were at present engaged in preparing a list of British Standards relating to the Associate Membership Examination of the Institution, for circulation to technical colleges.

Mr. C. M. Holloway had been re-elected Chairman of the Standards Committee for 1952/53.

Hazleton Memorial Library

The number of members making use of the Library facilities continued to increase, and the extended accommodation in the Council Room was already proving its value.

The Rt. Hon. Lord Sempill, A.F.C., had been re-elected Chairman of the Committee for 1952/53.

Standing Committees

Mr. J. France, Chairman of the Education Committee, moved that Standing Committees should be empowered to co-opt two additional members when necessary, in order to make use of specialised knowledge. The motion was carried.

Summer School and Weekend Schools

The Third Annual Summer School organised by the Institution was held in August (a report appeared in the October issue of the Journal). The School was extremely successful, and a pattern appeared to have been established which would serve as a future basis for development.

Council congratulated the London Graduate and Halifax Graduate Sections on the organisation of their Weekend Schools held in October and September respectively. It was felt that Graduates would derive great benefit from participation in this type of activity.

Local Section Reports

Council adopted the Local Section Reports, extracts from which appear on pages 635 to 643.

National Service

Council adopted a recommendation put forward by the Finance and General Purposes Committee that members of the Institution conscripted for National Service should, on application to the Secretary, be permitted to continue their membership during the period of compulsory service on payment of an annual subscription of 10s. 6d.

King George VI Memorial Fund

It was agreed that the Institution should donate the sum of one hundred guineas to this Fund.

Production Engineering Conference, 1953

On the recommendation of the Finance and General Purposes Committee, it was agreed that the Institution should hold a Conference in the autumn of 1953. A Sub-Committee with power to co-opt would be formed with full powers to organise the Conference, and it was further agreed that the Chairman of Council, Mr. Burke; Mr. Walter Puckey (Vice-President); Mr. M. Seaman (Chairman of the Editorial Committee); and Mr. W. J. T. Dimmock (Chairman of the Papers Committee); be invited to serve on this Sub-Committee.

Election of Members

Council approved a number of applications for membership and transfer, details of which appear on pages 644 to 648.

Honours The Secretary reported that Council's congratulations had already been forwarded to Colonel F. Thorpe, a Past President of the Melbourne Section, upon whom Her Majesty the Queen had conferred a Knighthood.

Obituary The deaths of the following members were recorded with regret : G. S. Bellamy, M.I.Prod.E., E. Bradshaw, M.I.Prod.E., H. C. Bullock, M.I.Prod.E., A. G. Chambers, Grad.I.Prod.E., H. C. Cook, M.I.Prod.E., J. B. Daws, A.M.I.Prod.E., K. Massa, A.M.I.Prod.E., T. G. Seed, A.M.I.Prod.E.

Date and Place of Next Meeting The next Meeting will be held on the 29th January, 1953, at 36 Portman Square, London, W.1., at 11 a.m.

H. E. The Hon. Norman E. Robertson, Canadian High Commisioner, Guest of Honour at the Institution's Annual Dinner, replying to the toast of "The Guests."

ANNUAL DINNER OF THE INSTITUTION

Thursday, 9th October, 1952

MORE than 500 members and guests attended the Annual Dinner of the Institution, which was held at the Dorchester Hotel, London, on Thursday, 9th October, 1952. The Guest of Honour was H.E. The Hon. Norman E. Robertson, High Commissioner for Canada, and Sir Cecil Weir, K.C.M.G., K.B.E., M.C., D.L., President of the Institution, occupied the Chair.

The Loyal Toast having been duly honoured, the President, in proposing the toast of "The Guests," said that although he had attended the two previous Annual Dinners of the Institution, on both those occasions he had been a guest—a very pleasant position for a Scotsman to find himself in! (*Laughter.*) Tonight he had an even more pleasant position, because he had the honour—and he regarded it as a very great honour—to be present as President of this great Institution, and he had the additional honour of proposing the toast of the guests.

"The Guests" There was a very distinguished list of guests—so distinguished, indeed, that he was going to ask their permission not to name them. They included in the premier place the chief guest, the High Commissioner for Canada, H.E. The Hon. Norman E. Robertson. (*Applause.*)

"I have many friends here," the President continued, "and they will all understand what a satisfaction it is to me that we should have as our chief guest a Canadian, and such a distinguished Canadian, a man who is in the United Kingdom for the second time as his country's High Commissioner, a man whose services inside the Canadian administration and on various missions abroad have been of immense value, not only to Canada but to the whole of the British Commonwealth. (*Applause.*)

"During the past few years, I have had close contact with Canada and with Canadians. Scotsmen are always very glad to have contact with Canada, because there are a great many of them in that country. I know only one who ever came back from Canada after going there, and that was because he knew his own language far too well. When he arrived he went straight to the Rockies and in the course of a walk, he came across a huge animal. He said to the man who was with him, 'What animal is that?' 'That,'

replied his Canadian friend, ' is a moose.' ' Well,' said the Scotsman, ' if yon's a mouse I'm awa' hame,' and he went home on the next boat. (*Laughter.*) He is the only Scotsman I know of who ever came back from Canada—except as a millionaire ! " (*Laughter.*)

As Chairman of the Dollar Export Board, the President said, he had visited Canada three or four times between 1949 and 1951 and he became confirmed in the belief that Canada was the greatest bet in the world today—a land of unlimited resources, a fine people, rich in initiative and enterprise, a country of terrific economic potentialities, and happy in the possession of a Federal Government and Provincial Governments willing to seize and exploit, for the benefit of their country and of mankind in general, the opportunities with which nature had endowed the Canadian nation.

Special Interest in Canada

The High Commissioner had asked why the Institution of Production Engineers in the United Kingdom should invite a Canadian to be their chief guest. The answer was quite simple, and the President was sure that it would be clear to everyone present. It was because Production Engineers had a special interest, by virtue of their profession and training, in the mammoth production job that had been and was being done in every sphere of industrial, engineering, agricultural and mineral development in Canada. These developments, which admittedly had an impetus in the two wars which had taken place in this generation, sprang nevertheless—and he said this advisedly—entirely from a virile consciousness in Canada of Canada's destiny to serve the cause of peace and progress.

This consciousness showed itself in many ways—in hydraulic schemes of fantastic power, in engineering projects which stirred the imagination, in transport undertakings of vast scope, and in wresting from the soil and the riches which lay beneath it the materials and projects which made industries revolve and provided the requirements of life, not only in Canada but in the United Kingdom and other countries.

In every one of these spheres the Production Engineer had a part to play, whether it was to produce in Britain the tools and machines, the turbines and cables, and all the other things that Canada required to import from abroad, or whether it was to apply the science of production engineering to the problems of Canadian development in Canada itself.

The Canadian Section

It was gratifying to the President, and to all his colleagues present, to be able to tell the chief guest that the Institution had established a Section in Canada, located in Toronto. The parent Institution hoped to build up in Canada a powerful family

of children. It was in this way that the Institution of Production Engineers—and Mr. J. D. Scaife knew this better than anybody in the room—had grown in the United Kingdom; Section after Section had been formed, until today there were over 9,000 members in the Institution. The President wished to add, however, in justice to every member of the Institution, that there was more concern about quality than about numbers, and Council would always try to ensure that membership of any of the grades of the Institution of Production Engineers was a qualification worth striving for and highly to be prized. (*Applause.*)

Production engineering was in many ways a model science, at any rate in the recognition of the place that production engineering played in the industry of this country. It was more and more coming to be recognised as a vital element in every manufacturing or producing enterprise. There were other specialised organisations and general organisations of great importance in the United Kingdom, and the President was particularly glad, since he was proposing the toast of " The Guests," to be able to say how delighted he and his colleagues were to see, on this occasion, representatives of those other professional institutions which were doing such a wonderful job for British industry. (*Applause.*)

There was no competition in this. They were all doing their own jobs and recognised the splendid services which these institutions gave to industry, and were proud to be closely associated with them. The President thought, however, that it would be accepted by them all that production engineering was an all-embracing science, covering the whole field of industry, and a profession which was developing in its importance with the growing consciousness of the need for greater productivity.

" All of us in this country," the President went on, " are, I hope, convinced today that the requirements of productivity are the most vital thing that can be taught to industry. I have been on the management side of industry and on the trade union side. We have taken a particular interest in the work and reports of the Anglo-American Council on Productivity and we are greatly honoured that Sir Greville Maginness, one of the Joint Chairmen of the British side of that Council, has spared an evening to be with us. (*Applause.*)

" The teams which have visited the United States, and which have been so wisely composed of all the elements in industry, have pointed the way to higher output, and to higher output in the individual sense, because this is, after all, an individual matter, when we get down to brass tacks. It is not a question only of machines, but of men giving the higher output that is required.

The President of the Institution, Sir Cecil Weir, K.C.M.G., K.B.E., M.C., D.L., (right) proposing the toast of "The Guests." The Canadian High Commissioner is on the President's right.

An Invaluable Contribution

"The implementation of their recommendations is a sphere in which we feel that we can make an effective and, indeed, an invaluable contribution. It is the field of the Production Engineer *par excellence*, and in it we accept our responsibilities. It was most encouraging to me, as the new President of this Institution, to attend in August all the sessions of the Institution's Summer School at Ashorne Hill, and to observe the interest of the students in these aspects of our trade.

"We are not in conflict with one another today; there are many parts of the world that are working today in closer association than has ever been known before in the history of mankind. It is time that we high-lighted some of these facts, instead of emphasising the differences between us and the difficulties which we face. The world is full of encouraging things today, and that is one of them.

" The emphasis on competition, however, has not been removed, and that is as it should be. Indeed, it is inherent in these arrangements that the spirit and the reality of competition should be preserved in the development of healthy and free economies. For Britain, which more than any other country depends for prosperity —and indeed for life—on exports, the ability to meet competition, from wherever it comes, from friend or from foe, is of paramount importance. It is in this field that the Production Engineer, not only in the engineering industry but in every field which uses machines and production techniques, has a vital part to play.

" I cannot appear for the first time as your President at this Annual Dinner without paying tribute to the work of my predecessors in the building up and operation of this Institution. It is to the people who create bodies of this kind that you owe your greatest debt of gratitude, not to those like myself who come in when the Institution is already a very powerful body. When I look at the list of Past Presidents I feel myself to be in very distinguished company, the company of men whose contribution to British industry has been significant.

Tribute to Principal Officers

" I should like especially to express the debt of gratitude which the Institution owes to two men who have held the principal offices during the past two years. The first is General Appleyard. No one who has had anything to do with the Institution of Production Engineers can be in any doubt about his interest in this Institution. (*Applause.*) I hold in my hand a telegram which was handed to me about ten minutes ago from General Appleyard. Where do you think it comes from ? It comes from Toronto, which is very nice when we have a Canadian as our Guest of Honour. General Appleyard cables:

> '*My greetings from Canada to you, to our principal guest, and to everyone at the Annual Dinner. Very sorry I am unable to be with you, but enjoying wonderful weather and hospitality here.*'

" General Appleyard, as you will all agree, set an example of activity which it would be hard for any President to follow, but I intend to do my best to equal his record. My opportunities will be more circumscribed than I had expected as a result of my being called on to go to Luxembourg as head of the British delegation to the High Authority of the European Coal and Steel Community, which is better known to most of you as the Schumann Plan. I am happy, however, in the thought that this novel work which I have undertaken is so closely associated with the production of those basic commodities on which every economy must depend for its successful development, and I feel it is not inappropriate that someone who holds the position that I do in your Institution and

in British industry should have been given this exciting and interesting task. (*Applause.*) If it should prevent me giving the time that I should like to give to visiting the Sections of the Institution throughout Great Britain, I am sure that I shall be forgiven, but I shall do my best.

"The other man I want to mention who has been so great a leader and servant of the Institution is Mr. Walter Puckey —(*applause*)—your Chairman of Council for the past two years. In spite of being chosen to assist the Government in the urgent task of aircraft production—perhaps the most urgent task with which we have to deal today—he has found time to attend in a particularly effective way to his duties as your Chairman, and we are very proud that while holding that office, he should have been selected for a job of outstanding national importance.

"Your new Chairman, Mr. Harold Burke, from whom you will be hearing later, and I, with the support of the very excellent staff of the Institution—and I know you would all like to join with me in thanking Mr. Woodford and his colleagues for what they do—(*applause*)—will do all that we can to keep the flag flying. That presents no difficulties whatever, but we shall also try to do what our predecessors have done and hoist the flag of the Institution a little higher—not that it has ever been at half-mast !

"Mr. High Commissioner, we feel particularly honoured that a man holding your very high position in this country should have been able, in the midst of your many engagements, to come here to speak to us. We are looking forward very much to hearing you. I ask all of you here to join in this toast to the guests, and to honour Mr. Robertson."

Response by H.E. The Hon. Norman Robertson

H.E. The Hon. Norman E. Robertson, High Commissioner for Canada, said, in response:

"It is a great honour that you have done me, and my country, in inviting me to be your guest. You have referred to the association of your Institution with Canada. I hope that your branch in Canada will grow and flourish, and perhaps some day reach dimensions comparable with those of this enormous gathering tonight."

Work of the Dollar Export Board

Continuing, His Excellency said that in the presence of the President, Sir Cecil Weir, he would like to begin by saying a little more about the work of the Dollar Export Board, and the part played in it by Sir Cecil. It had been a very important factor in doing a very important job over these last years. A good many things had been working for righteousness and had helped in

bringing about the satisfactory results which had been achieved, and it was not possible to single them all out; but there was no doubt in his mind that the work of the Dollar Export Board, in stimulating United Kingdom exports to Canada over the last three years, had played a very great part in the development of United Kingdom trade with Canada and in the expansion of dollar exports. These were decisive at this stage of history, because it was vital to get this situation sorted out and working; it was vital to both countries. In that task Sir Cecil Weir and his colleagues had played a very great part.

In Canada there had been almost unexampled co-operation. His Excellency could speak for the Government of Canada and for the Provincial Governments, but it had gone further than that. They had seen the problem in terms of the balance of payments, and Great Britain even got co-operation from her competitors—and that was something for which there were not many precedents in the history of commercial relations ! (*Applause.*)

Chief among the colleagues who had worked in Canada with Sir Cecil Weir was his co-Chairman, Mr. J. S. Duncan, who put his whole heart and soul and a great deal of time and effort into the job of helping to get United Kingdom exports back into the Canadian market, from which they had been cut off as one of the major casualties of the war. In that job he had the support from coast to coast of a very representative Canadian company, and the continuing support of the Canadian Minister of Trade and Commerce, Mr. C. D. Howe.

British Exports to Canada

These results were good, but even the best results were not good enough. The figures, however, were encouraging, and it was extraordinary to be able to say that British exports to Canada in the last year were six times as great as they were before the war. They were valued in 1939, the High Commissioner was told by expert advisers, at between £23 and £24 million. For the last complete fiscal year they were £137 million. (*Applause.*) Whether this was taken in absolute terms or in terms of dollar earnings or in terms of *per capita* Canadian consumption of British exports, it was encouraging and good. Without making invidious comparisons, he had been struck by the fact that the U.K. shipped to Canada last year £137 million of goods, and to the United States £136 million. (*Applause.*)

He wanted to put the emphasis, however, not on the fact that Canada bought £137 million and the United States £136 million, but where he thought that it rightly belonged, on the fact that the United Kingdom sold to Canada goods of that value. When he looked at those figures, he was pleased statistically, on an evening

like this, to be able to say that Canada bought more but, looking at it in terms of Canadian industry, the moral was that the United Kingdom ought to sell more to the United States at the same time. (*Laughter.*) It was true that at the moment the Canadian dollar was a little better than the American dollar—(*applause*)—but the latter was not to be sneezed at. (*Laughter.*)

If the United Kingdom could—and he was sure that she could—count ultimately on the same kind of co-operation in the United States that she got in Canada, he was sure that it was in the common interest on both sides of the parallel which divided the continent that the United Kingdom should make the same effort and get the same results, for then they should all be well out of the woods. That was a job in which Production Engineers had a great part to play.

Importance of Competition

His Excellency commented that he had made a note about quality, price and delivery dates, and also about the increasing importance of being competitive. It was the clear moral of what the Chancellor of the Exchequer had said at the Mansion House when he made a very clear—and he would say as a Canadian, very encouraging—definition of what he thought were the bases of a really permanent policy of recovery and progress for this and the other countries of the sterling area. The real basis on which financial arrangements would be worked out was a completely competitive position for United Kingdom exports in every market, whether inside the sterling area, inside the Commonwealth, or in any part of the world.

On that point, one of the achievements of this impressive increase in exports to Canada was that it had been done in spite of temptations elsewhere. He could hardly say, in the presence of his Australian colleague, that it was done against the drag of a much easier market, but there had been until recently a great temptation to find easier and softer markets, and production—just production—met the bill. Now he thought that it had to be production on a cost basis which made goods from the United Kingdom better value for the money than goods from anywhere else in the world.

A Great Opportunity

His Excellency continued: " There it would seem to me, as a layman, that you have a great opportunity and responsibility. It is a situation where competition coming in on a price basis is going to add an extra edge and stimulus to what is always a good exhortation; but when it comes to placing the goods you can sell in markets which you can hold, you are really doing a job which has to be done for this country, and in that job you can count on the co-operation,

the support and the encouragement of all of us. Certainly our Government in Canada is committed to the kind of policy which will make an effort of that kind on your part productive and permanent in results.

" I should like on this occasion, talking to the Institution of Production Engineers, to say a word about one special subject, a limited aspect of the efforts that the United Kingdom Government is making through its various agencies, one of which was the Dollar Export Board. There was a series in which we did not share and I complained to Sir Cecil that the Anglo-American Productivity Council went back and forth by way of New York; but we have a triangular interest in the operation. In a similar way, and perhaps in a way that may lead us a good distance, your Government has taken an initiative which I think will be of value to both the United Kingdom and Canada, and which I take this opportunity of acknowledging. It was one of the results of the United Kingdom Engineering Mission to Canada five years ago.

The Athlone Fellowships

" In their report, I think they expressed the feeling that basically Sir Cecil Weir and his colleagues could get the support and the cordial endorsement of the Boards of Directors of every big company and of the Presidents and General Managers, but that the real difficulties came further down the line with the Production Engineers, who said: ' It is all very well to tell us what to buy in terms of the balance of payments and even of prime costs, but we like to work with something that we have known before.' Your people ran into the difficulty of unfamiliarity, particularly at the Works Engineer level. One of the recommendations was that something could be done to correct this, and one result of that recommendation was the establishment by the United Kingdom Government of the happily-named Athlone Fellowships; we have all very pleasant and friendly memories of the period during which Lord Athlone and Princess Alice represented the King in Canada. (*Applause.*)

" It is a big and imaginative project for a Government in these days to provide 35 very substantial Fellowships a year for well-trained Canadian engineers and scientists to come to this country, half of them going into the technical universities and half into industry, with the object that they shall go back to Canada aware of what the best people are doing and of what the best processes are in this country. I do not think that you can expect to see quick and spectacular results from that kind of development, but it seems to be a good investment, taking the long view, and one from which

Mr. F. H. Rolt, O.B.E., (left) who presented the Sir Alfred Herbert Paper, 1952, received an inscribed silver salver.

we shall both gain. (*Applause.*) That sort of thing will provide a good basis for the right kind of continuing development of trade between us.

"I thank you again very much for the great privilege and honour of being your guest, and I thank you for all the nice things that you have said about my country. I thank you also on behalf of my fellow-guests for the very gracious hospitality of the Institution of Production Engineers." (*Applause.*)

Acknowledgement by Mr. Harold Burke

Mr. Harold Burke, Chairman of Council of the Institution, said that the assignment given to him on this occasion was one of acknowledgement, which indicated a new step in the progress of the Institution of Production Engineers; it was his duty and very pleasant task to acknowledge the words which they had heard from H.E. The Hon. Norman Robertson.

Mr. Burke had been thrilled to learn that a message had been received from General Appleyard in Toronto. Three weeks ago he himself had been in Toronto, enjoying Canadian hospitality in Canadian homes, which was in his view by far the best way to enjoy

it. He had been privileged also to take a little part in the work of the Institution in Toronto in a number of meetings during that week.

Development in Canada

He had been most impressed by the progress which had been made since his last visit, industrially and also in the Institution. He felt that they had made a great deal of progress, and that progress would be even faster in the near future. As a matter of fact, since he had left, he had learned that steps were being taken to form a Section in Montreal. (*Applause.*)

Looking back five years or so, Mr. Burke seemed to remember that the Australian branch, which was now a Sub-Council with three Sections, was started in the same way; and he therefore looked forward to the day in the not-too-distant future when they might see what was now a thriving Section in Toronto blossoming forth into a Canadian Sub-Council, and when further West there would be Sections to represent Canadian interests.

He had formed the opinion that there was a terrific Canadian potential, both in membership and industrially; but he would plead that there was a great deal of work still to be done, particularly

Mr. J. S. Redshaw, O.B.E., M.I.N.A., receiving the Institution Medal for the Best Paper by a Non-Member, 1950/1951.

(left to right) Mr. P. K. Eisner and Mr. H. P. Jost with Mr. Robertson after receiving the joint award for the Best Paper by a Member, 1950/1951.

educationally. If he might strike a note in the mind of the High Commissioner, he would make a plea for some thought to be given to post-graduate technical education for the Production Engineer in Canada. He had made many enquiries about where Production Engineers came from in Canada, and he found that they were imported either from the United Kingdom or from the United States. There was a great deal of work still to be done there.

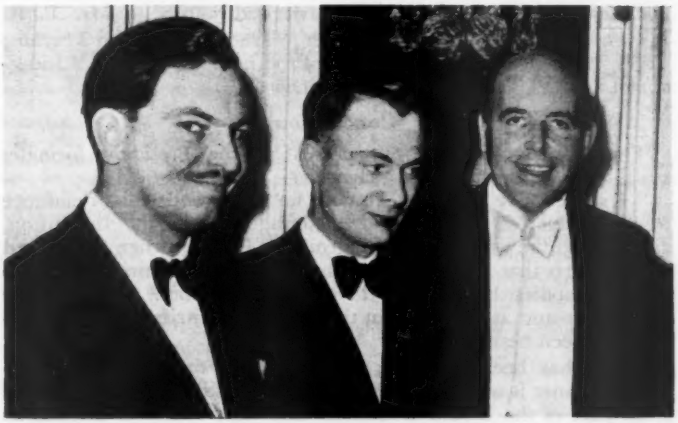
Expansion Overseas

He would supplement the remarks of the President by offering a welcome to the members of the commonwealth of nations present. It was a great thing to be able to say that they had with them representatives of the High Commissioner for India. (*Applause.*) The Indian Sections of the Institution had progressed from strength to strength in the last ten years, owing to the excellence of the foundations laid some years ago by Mr. Scaife and built upon by Colonel Warren-Boulton, whom they were glad to welcome. (*Applause.*)

The Institution in Australia was making very rapid progress, and they were delighted to see the Deputy High Commissioner for Australia. (*Applause.*) From South Africa they welcomed the Deputy High Commissioner, and hoped that he had enjoyed their hospitality. (*Applause.*)

In much the same way that he had found words inadequate to tell his Canadian hosts three weeks ago how much he had enjoyed their hospitality and their company and the opportunity to talk with them and get to know something of their lives and experiences, Mr. Burke now found words almost inadequate to say, on behalf of the Institution, how much they had appreciated the speech which the High Commissioner for Canada had made, and the work that he was doing. (*Applause.*)

"The High Commissioner may be interested to know," said Mr. Burke, "that I spent a good deal of time in my leisure hours trying to find out from British immigrants to Canada why on earth they went to Canada anyway. (*Laughter.*) I found that the reasons varied a good deal. Some of them were not doing quite so well as they did in this country, and others were doing a great deal better. I talked to people who had been in Canada for one year and to others who had been there for 22 years, and to many others in between and I found that they had definitely made up their minds that they would not come back to this country. They felt that Canada was a land of enterprise and gave opportunities which they wanted to take. It was a great spirit and I was very thrilled. I should like to say how much I enjoyed having that opportunity and also how much I have enjoyed this opportunity of being able to say publicly what the Institution owes to people of that type." (*Applause.*)



(left) Mr. J. Irwin (Lord Austin Prize Winner 1951), and Mr. R. S. Cracknell (centre) who was awarded a Certificate of Merit, with Mr. Robertson after the presentations.

Presentation of Institution Awards

At the invitation of the President, the following awards were then presented by H.E. The Hon. Norman Robertson:—

The Sir Alfred Herbert Paper, 1952. An inscribed silver salver was presented to Mr. F. H. Rolt, O.B.E., B.Sc., A.C.G.I., M.I.Mech.E., M.I.Prod.E., for his paper entitled "The Development of Engineering Metrology."

Institution Medal for the Best Paper Presented by a Non-Member, 1950/51, presented to Mr. J. S. Redshaw, O.B.E., M.I.N.A., for his paper "Building an Ocean Liner."

Institution Medal for the Best Paper by a Member, 1950/51, presented jointly to Mr. P. K. Eisner, Grad.I.Prod.E., for his paper "Tracer Controlled Machine Tools," and Mr. H. P. Jost, A.M.I.Prod.E., for his paper entitled "Industrial Law and The Production Engineer."

The Schofield Travel Scholarship, 1952, presented *in absentia* to Mr. D. C. Howard, Grad.I.Prod.E. Mr. Howard was travelling with his Scholarship and therefore was unable to be present.

Lord Austin Prize, 1951, presented to Mr. J. Irwin, Grad.I.Prod.E., for his essay "The Automatic Production of Pressed Glassware." Certificates of Merit were awarded to Mr. R. S. Cracknell, Grad.I.Prod.E., and Mr. D. Whitehead, Grad.I.Prod.E.

Hutchinson Memorial Award, 1951, presented jointly to Mr. P. K. Eisner, Grad.I.Prod.E., for his paper "Tracer Controlled Machine Tools," and Mr. H. P. Jost, A.M.I.Prod.E., for his paper "Industrial Law and The Production Engineer."

Conclusion

The Awards having been presented, the President formally concluded the proceedings. He said:

"I should like to thank you all for the wonderful attendance tonight, which is a very great encouragement to the Institution, and to echo the words of the Chairman of Council when he referred to the efforts that we are making throughout the Commonwealth to build up bodies, based upon this parent Institution, which will be as effective and as successful in the various countries as this Institution has been here.

"This has been Canada's night because the Canadian High Commissioner is our chief guest; but I can assure you all that there is no part of the British Commonwealth that is not as dear to us as Canada, and no part of the Commonwealth that is dearer to us than Canada. That is the kind of family which is the British Commonwealth of Nations." (*Applause.*)

EXTRACTS FROM
LOCAL SECTION REPORTS

Adelaide

In July, members were invited to the works of the E.M.F. Co., to hear an address by the Technical Sales Manager, entitled " Electric Resistance Welding Machines," and illustrated from actual machines shown in operation. During these past three months, the average attendance at meetings has been approximately 50 members and visitors—a little below normal—but this is to be expected during the winter period.

The Section President, Mr. W. Gwinnett, returned from his visit to England just a few weeks ago and presided at the last Section Committee Meeting.

Next month the Section will hold the second Annual General Meeting, when Mr. Gwinnett will deliver his Presidential Address, having completed a period of two years as the Adelaide Section President.

Birmingham

The Committee are considering combining with the Midland Branch of A.S.L.I.B. to hear a paper on " The Use of Technical Information in Industry " ; this will probably be held in March, 1953.

The Section is co-operating with the Extra Mural Department of the University of Birmingham in two further Extra Mural Courses related to Production Engineering, " Statistics, Probability and Experiment," and " The Machining of Metal Surfaces."

Section lecture programmes have been the subject of some considerable thought and planning by a special sub-committee formed in December, 1951. This report upon the long term planning of Section programmes has now been issued to all Sections.

Mr. J. France, Section President, has taken over the General Management of the Liverpool Factory of The Lockheed Hydraulic Brake Co. Ltd., and as this will restrict his attendance at Committee Meetings, Mr. B. G. L. Jackman has been elected Deputy President and will assist Mr. France in this capacity.

Bombay

In July and August, Mr. Lawrence K. Lord, B.Sc., A.M.I.Mech.E., Grad.I.Prod.E., from the Coventry Section and a visitor to Bombay, presented a two-part paper, the first being " The Nature of Tunsten Carbide " and the second, " The Technique of Carbide Tooling."

The new Committee met for the first time in the beginning of July, and the various sub-committees were formed. At this meeting, the development of the Graduate Section was discussed and it was felt by the Committee that in view of the very small number of Graduates and Students resident in Bombay who would be able to attend the meetings, further development of the Graduate Section be held in abeyance.

A new feature has been introduced whereby each member is allowed to bring to meetings two accompanying guests.

Applications for membership are still being received and at the moment the membership roll stands at 103.

Calcutta

Owing to the unpleasant and hot summer in Calcutta, only Committee meetings have been held, and the Minutes of these meetings have been forwarded to London. At a Committee meeting held on the 19th September, a Section meeting was proposed for the 16th October, when the Section Chairman gave

an address. Further meetings are being arranged each month. In addition to this, works visits are being planned. It is also hoped to hold a Dinner Meeting sometime in November.

Progress is being made by Mr. Sen Gupta, in conjunction with Mr. N. M. Walton, regarding the Graduate Section, and it is hoped to be able to report something more concrete very shortly.

Canada

The Canadian Section held a special meeting at Royal York Hotel, Toronto, on Friday, 12th September, in honour of the visit of Mr. Harold Burke, Chairman of Council. Twenty-two members were present at what was considered to be the most significant meeting since the formation of the Section.

Mr. Burke, in his talk, outlined the organisation of The Institution of Production Engineers in Great Britain. He also explained the history and working of other overseas Sections and spoke about the Canadian Section. In the discussion that followed, many points of interest were put forward. It was stated that one of the great weaknesses in Canada, and in fact the greatest difficulty facing the Canadian Section, was the complete absence of technical courses through which a man could train for Production Engineering and also take the examination of the Institution. It is hoped that Mr. T. B. Worth, the Institution Education Officer, will be able to come to Canada in the near future and give assistance in the setting up of Production Engineering courses here.

In discussing the programme for the coming winter, it was stressed that the Section should concentrate on arranging a few good evenings rather than exchange quality for quantity.

The meeting also put forward their desire for a visit by Mr. W. F. S. Woodford to assist in obtaining the interest of Canadian industrialists in the work of the Institution, and also to co-ordinate the working of the Canadian Section with other overseas Sections, in view of the peculiarities attached to the running, working and operation of the Canadian Section.

Following the discussion, Section Officers and Committee were elected as follows :

Chairman : C. J. Luby

Honorary Secretary : T. H. Beard

Committee Members : F. D. H. Ronald, S. S. Pritchard, W. M. Buchanan, H. L. Ward, A. R. Jupp, R. E. Garner.

Two motions were carried, as follows :

(a) That a prominent Canadian industrialist be invited to become the Section's first President ;

(b) That work on a winter programme be started immediately.

When the meeting adjourned, enthusiasm for the future prospects of the Section was high, and those who had travelled a hundred miles to attend felt well repaid.

Cornwall

With the exception of Committee meetings, there has been no activity in the Section during the summer months.

The Committee are very confident that the general improvement of the past Session will continue.

The programme for 1952/53 is completed and many new names are appearing on the Section mailing list for posters and details.

Coventry

During the summer months, the Section Committee held regular meetings which were always well attended. Special efforts were made to provide a lecture programme for the 1952/53 Session by selecting subjects of the greatest common interest to members.

Following the practice during the last Session two lectures, one held jointly with the I.E.E., will be held in Rugby, where membership over the last two years has considerably increased.

It was fortunate for this Section that the Institution Summer School was held at Ashorne Hill. A considerable number of junior members and a few seniors attended the School for the full session, and a most enjoyable and instructive evening was spent on the Friday, nearly all Section Committee members being present.

Coventry Graduate

During the past three months, the Section Committee has been busy arranging the lecture programme and works visits for the forthcoming 1952/53 Session. It was decided at the outset that a single theme should predominate throughout the programme, and this has been adhered to as closely as possible, although some difficulty has been experienced in obtaining suitable speakers.

Before the programme was completed, the local Sections of other institutions were contacted to ensure the minimum overlapping of lecture dates. Arising from these meetings, co-operation in the sphere of social activities has been discussed at some length with, it is hoped, mutual benefit to all the parties concerned. A further result of these discussions has been the setting up of a Social Sub-Committee, consisting of two members of the Graduate Committee, with the object of organising any Graduate Section social activities and also to ensure the maximum co-operation with other Institutions' Graduate Sections in this field.

Eastern Counties

The lecture Session opened on 10th October, with a meeting at Colchester, held jointly with the local Engineering Society. These annual meetings at Colchester provide an opportunity to further the work of the Institution in an area which has a most enthusiastic and growing membership.

With the lecture programme completed, the Section is looking forward to an interesting Session, particularly from the contributions by local lecturers.

Mr. C. R. Chandler has consented to serve on the newly-formed Papers Committee as a " corresponding " member.

The Section is pleased to welcome Mr. R. Craven, A.M.I.Prod.E., as a member of the Section Committee.

Glasgow

In September, members of the Section visited the works of A. F. Stoddard & Co. Ltd., Carpet Manufacturers, Elderslie. The Glasgow Committee is indebted to the Company for their hospitality.

Arrangements for the Session 1952/52 programme have now been completed and the subjects chosen cover a wide field in Production Engineering and should appeal to all members. The Committee have decided to devote two evenings to full Section discussions on various types of machine tools.

Applications for membership continue to be received at a satisfactory rate.

Halifax

All preparations for the winter session are complete, and the programme of meetings includes variations from previous years and shows promise of interesting gatherings.

The Section President has paid tribute to the enthusiasm of the Graduate Officers and Committee, with special reference to the Chairman, Mr. R. S. Cracknell, who has been awarded a Certificate of Merit for his paper submitted for the Lord Austin Prize.

Attendance at Council Meetings

The following resolution was passed at a recent meeting of the Halifax Section Committee :—

" Realising that the practice of a deputy attending Council Meetings in the event of a Section President being unable to do so, is not at present allowed,

the Halifax Section request that when the Articles of Association are being revised this subject should have the earnest consideration of Council as follows :—

(a) For the especial benefit of Sections entitled to only one representative on Council.

(b) Bearing in mind that nowadays Presidents are often abroad for some period of their term of office, making it quite impossible for them to attend.

(c) It is considered to be most desirable that Sections should have the opportunity of being represented at every Council."

Halifax Graduate

The first Section Week-end School was held on the 6th and 7th September, at the Craiglands Hotel, Ilkley, and it was evident to all the members that the School was highly successful. At the opening Session there were fifteen members and guests present, including Mr. Worth, the Institution Education Officer. The thanks of all at Halifax go to Mr. Worth for his valuable advice, and to Mr. Woodford for his assistance in many phases of the preparatory work which led to the success of the week-end.

A Sub-Committee has been elected to organise the 1953 Graduate Conference and as soon as a decision is reached on the date and venue of the Conference, all Sections will be notified.

Lincoln

The activities of the Section during the period under review have been confined to works visits. In June, a full day was spent visiting the works of Alfred Herbert Ltd., Coventry, and in July, members visited the works of Ambrose Shardlow Ltd., Sheffield. The members of this Section are very grateful for the kindness shown to them on both of these visits.

Mr. T. McGlashan, who has been a member of the Section Committee since its formation, has retired. This will be a great loss, as it was during his two years as Chairman that the Section was raised to full status. Members will long remember his loyalty and great service.

The Section has been fortunate in obtaining Mr. Oram, of Appleby Frodingham Steel Co., Scunthorpe, as Mr. McGlashan's successor.

Liverpool

The Section resumed activities on the 3rd September, a Committee meeting being held at the Exchange Hotel, Liverpool. Mr. J. O. Knowles, Managing Director of Brookhirst Switchgear Ltd., Chester, the new Section President, was welcomed by the Committee. The Section Committee Chairman, Mr. H. O. Pate, extended a hearty welcome to Mr. G. T. Spence, new Committee member, and to Mr. B. H. Jones and Mr. C. W. Haigh, Chairman and Secretary respectively of the Graduate Section.

Liverpool Graduate

A strong Committee has been elected for this year and four lectures are being arranged for this Session under the following headings :

1. Television
2. American Methods
3. Industrial Administration
4. Metrology

Hazleton Memorial Library books have again started to flow in for abstracts to be prepared by the Sub-Committee.

London Graduate

An analysis of members' attendances at lecture meetings has been made for the first half of 1951/52 Session, and the result would be interesting if compared with other Graduate Sections. The total strength of the Section at the end of 1951

was 477, of which 365 were Graduates and 112 were Students. It is interesting to note that technical subjects attracted better attendances than managerial subjects.

The Technique of Tooling Study Group is carrying out some practical experiments and are in the process of compiling a preliminary report. The Group have greatly appreciated the presence of the Education Officer, Mr. T. B. Worth, at several of their meetings, and the help received from various firms.

The Committee were pleased to note that another Graduate of the Section, Mr. J. Irwin, has been awarded the Lord Austin Prize for 1951, for his essay on "The Automatic Production of Pressed Glassware."

Luton Graduate

Local Activities

On 12th July, an all-day visit took place to the College of Aeronautics, Cranfield, and proved to be an exceptionally entertaining and instructive tour. Considerable interest was shown by all attending, and the Section is deeply indebted to Professor Connolly for the facilities offered.

Working Group.

The Study Group is at present engaged on formulating its final report.

Membership Growth.

In view of the increasing number of new members from the Hatfield-St. Albans area, it is pleasing to observe that there has been a corresponding increase in Committee representation from this area. Committee meetings are held alternately in Luton and St. Albans, so that individual members are not penalised unduly.

Manchester

Local Activities.

The Syllabus Sub-Committee have completed the programme for the 1952/53 Session. This gives promise of some excellent lectures, mostly of an original nature.

The Manchester Committee have been pleased to note that the Section President, Mr. R. H. S. Turner, has been promoted to Assistant Works Manager, Main Works, of the Metropolitan-Vickers Electrical Co. Ltd.

An enjoyable Sunday afternoon was spent by certain members of the Manchester and Preston Sections in competing for a golf trophy. The match finished in favour of the Preston Section.

A visit was arranged on 10th September, for members of the Manchester Section, and one or two officials of the Liverpool Section, to view the plant of Fisher & Ludlow's Works at Castle Bromwich.

Manchester Graduate

Although there is very little Section activity during the summer, the Section Committee have been busy completing the programme for the 1952/53 Session. Again a varied and interesting programme has been arranged and, in addition, four visits up to and including December have been covered.

Melbourne

The first lecture to be given outside Melbourne was held at Geelong in June, and was an outstanding success. The afternoon was spent in a works visit to Ford Motor Co., where visitors were entertained to lunch. Following the visit, the party adjourned to the Carlton Hotel, where a company of 105 partook of a buffet dinner. This was followed by an illustrated lecture by Mr. Andrew Miller of Ford Motor Co., entitled "Production has the Green Light." The President of the Sub-Council, Sir John Storey, was present and addressed the meeting on the value of the Institution in industry.

The Section is proud to note that one of its members and a Past President, Sir Fred Thorpe, appeared in the birthday honours list of Her Majesty the Queen.

It is particularly encouraging to note that the attendances this year have been much improved on other years.

Northern Ireland

Details of the 1952/53 Section Programme are now complete, and the Section had a good start with a works visit to the Nylon Factory at Newtonards, Co. Down. This proved to be a most interesting and instructive outing, particularly as members were permitted to bring along their ladies. Sincere appreciation was expressed to the Manager of this factory for the kindness shown during the visit.

Preston

Golf Match.

The annual Manchester-Preston golf match was revived this year and took place in Manchester on 31st August. Preston was again victorious, but far more important, a good day was had by all concerned, and several friendships were renewed. Since Liverpool Section was formed from Preston and Manchester, it is now suggested that Liverpool be asked to compete in a three-cornered contest.

Section Committee.

Mr. J. G. Nickson has resigned from the Committee after nine years of good and loyal service. He has left the profession to take up farming, and all will wish him well in this new venture. His place has been taken by Mr. H. Carleton, who also takes on the duties of Social Secretary. He has a large task in front of him, but has started with a will and has the undivided support of the remainder of the Committee.

Reading

Oxford Sub-Section.

The Inaugural Meeting of the Sub-Section took place in November. Five lectures have already been arranged.

Visit to Vauxhall Motors, Luton.

An enjoyable and interesting visit was made by 23 members in June to the above works. Members were entertained to lunch and tea.

Papers Committee.

Mr. W. F. Reid has agreed to be this Section's attending member of the above Committee.

Sheffield Graduate

During the summer recess the Section has had two successful works visits. The first, to the Parkgate Iron & Steel Co. Ltd., was an evening trip ; the second, to Alfred Herbert Ltd. of Coventry, occupied a complete day.

The Committee feel that when the *News Sheet*, a publication referred to in the previous reports, is issued, the response to the Committee's request for members' views on lectures and visits will enable them to select lectures, etc., more to the liking of the members. This *News Sheet* will be published quarterly and is intended primarily to convey to the more distant members what is " going on." By this means the Committee believe that these members will be getting their share of the Institution's activities. They also hope that it will encourage more visitors, who are potential members of the Institution, to come to meetings.

Shrewsbury

During the past quarter, representatives of this Section have joined in two meetings with other Midland Sections in an effort to establish Regional Organisation. Very favourable reports have been received in subsequent Committee meetings and it is felt that considerable benefit will result from these developments.

The Section Committee have met on three occasions and dealt with the final arrangements for the 1952/53 lecture programme and, in particular, the Inaugural Meeting of the full Section which was held on Saturday, 20th September, when Sir Cecil Weir was present.

South Africa

Following a paper by Mr. H. J. G. Goyns, entitled " Made in South Africa," a visit was arranged to Klipworks, Vereeniging. The Annual General Meeting was held in August.

Rhodesian Sub-Section.

The formation of a Rhodesian Sub-Section is under way. Two members have volunteered to act as Secretaries, one for Southern and the other for Northern Rhodesia.

Technical and Educational Committee.

The above Committee has been formed to draw up a suitable qualification code, which is to be circulated to members who wish to qualify for membership. The memorandum will give the subjects, syllabuses and text book requirements which are available in this country.

Sydney

Research—Working Groups.

In September, the No. 1 Working Group, under the Chairmanship of Mr. C. S. Curtis, presented their paper entitled " An Investigation into Design and Drawing Office Practice in New South Wales." This paper was the culmination of twelve months' solid work by Messrs. C. S. Curtis, N. A. Esserman, C. A. Gladman, H. A. Colton, R. A. Barter, E. Hewison, J. Rector, H. H. Reid, C. Harris and J. B. Finlay. During these twelve months, the Working Group circulated to the engineering firms in New South Wales, drawings of an oil gear pump used in an internal combustion engine, asking them to dimension the drawings as they would in their normal drawing office practice and according to their usual design practice. When these drawings were completed, they were returned to the Working Group who, in the meantime had prepared analysis sheets, and they then recorded results from the various firms. The outcome of this survey revealed very strikingly that there was little or no standardisation amongst these firms and very little use was made of standards.

The members of the Sydney Section feel that the work put in by this No. 1 Working Group enabled their first project to be an overwhelming success and they feel that it will lead to more successful ventures with other Working Groups.

South Essex

During this quarter, the Committee have successfully arranged the 1952/53 programme and have increased the number of General Meetings from seven to eight. Several well-known industrialists have agreed to read papers before the Section during the coming winter.

The Committee, due to retirements, is still under strength, but arrangements are in hand to increase the Committee strength by two.

Southern

The Section Committee have met recently with Mr. W. F. S. Woodford to discuss the possibility of holding a winter conference at Southampton University and it would appear that there is every likelihood of this venture going forward and taking place during the winter recess in December of this year. (See page 585 this issue).

South Wales and Monmouthshire

A very enjoyable function was organised for the Committee and their ladies, when they attended an evening performance of " Oklahoma " at the New Theatre, Cardiff, which was followed by a dinner at the Park Hotel. This was the last official function of the retiring President, Mr. A. R. Northover, and tributes were paid to the work done by him during what was unanimously agreed to be one of the most successful periods in the history of the Section.

A visit has been arranged to the Anglo-Iranian Oil Refinery during the winter season, and as soon as all details have been completed they will be circulated to members.

Western

By kind permission of Mr. J. R. Petrie, B.Sc., M.I.Mech.E., M.I.Prod.E., Principal, a meeting was held at the School of Technology of S. Smith & Sons (England) Ltd., at Cheltenham, on the 15th October, 1952. A Committee was elected under the chairmanship of Mr. L. E. Broome, A.M.I.Prod.E., and Mr. P. C. Bradshaw was elected Honorary Secretary. The Committee are making immediate plans to arrange a programme of meetings in the current Session. There are upwards of 100 members in the Cheltenham and Gloucester area and a flourishing Sub-Section should soon be established.

West Wales

Discussions in Committee have been particularly keen in respect of the interpretation of " broadening the base " and it is hoped that good effects will be forthcoming from the efforts which have recently been made with regard to co-ordinated meetings. In an endeavour to reduce the number of small meetings of a number of institutes in this locality, a co-ordinating committee has been set up, comprising representatives of :

The Institution of Production Engineers
The Training Within Industry Association of Wales and Monmouthshire
The Institute of Personnel Management
The Institute of Industrial Administration
The Institute of Industrial Supervisors
The Royal Society for Prevention of Accidents.

The main object is not only to reduce the number of lectures, but also to bring to the new industrial area in West Wales national leaders of industry to address all members and thereby enhance the quality of papers to be read.

Although these co-ordinated lectures concern chiefly the administrative side, it is anticipated that next Session further co-ordination with the technical institutes will materialise.

In addition, the Section programme covers a very wide range of interest, which will appeal to all members and others interested in the industrial development of the area. The programme opened with a visit to the Trostre Works of the Steel Company of Wales, during which the Section President, Capt. Leighton Davies, C.B.E., J.P., presented his Inaugural Address.

The Section has already visited the Standard Motor Company at Coventry, in which members were privileged to study the complete manufacture of Ferguson Tractors, and it proved so interesting that the Section anticipate a visit to the Austin Motor Company next May, which will be preceded by a visit to the Anglo-Celtic Watch Company at Ystradgynlais.

Wolverhampton

A very interesting programme has now been arranged and the Committee are looking forward to a very successful Session. The first meeting was held on 1st October, at the Technical College, when a brief reading of the Sir Alfred Herbert Paper, " The Development of Engineering Metrology " was given by Mr. F. H. Rolt, O.B.E., followed by a full discussion. The Wolverhampton Section, with the full support of the Regional Committee, was responsible for the arrangements for this meeting, which was the first Regional Paper to be given in the Midland Region.

The second meeting of the Regional Committee was held on 11th September, at Rugby, with Mr. Price, President of the Coventry Section, in the Chair, when many subjects of interest in the Region were discussed and an exchange of information of Section activities made.

Many members of the Wolverhampton Section attended the Inaugural Meeting of the Shrewsbury Section on 20th September, and the benefit that can be obtained from Regional Organisation, particularly with regard to this kind of function, was again evident.

The Committee are appreciative of the fact that five of its members have been selected to serve on various Standing Committees.

Wolverhampton Graduate

In September, a visit took place to the works of F. H. Lloyd & Co. Ltd., James Bridge Works, near Wednesbury. On the social side, another Graduates' Dance was held in October.

The Section Committee has started its Session very actively once again, much hard work has been carried out by all the various members and they are to be complimented for their fine endeavours. The present Section Committee consists of one-third old members and the remaining two-thirds are new members who came on the Committee at the last Annual General Meeting.

Yorkshire

The Annual Golf Match between members of the Yorkshire Section and the Leeds Association of Engineers was held in July, and was won by the Production Engineers for the first time.

The annual competition for T'Owd Tin Pot was held on the 22nd August and was won by Mr. R. A. Rogers.

ELECTION OF MEMBERS

October, 1952

The following were elected to membership by Council :—

ADELAIDE SECTION

As Associate Member :
F. C. Hackworth.

BIRMINGHAM SECTION

As Member :
K. G. Lewis.
Re-Instatement as Member :
H. Shaw.
As Associate Member :
W. A. Newbery.
Transfer—
From Student to Graduate :
C. W. Smith.
As Graduates :
B. K. Mukherji, M. H. Khan.
As Student :
J. C. Remfrey.

BOMBAY SECTION

As Associate Member :
H. N. Rao.
As Associate :
H. J. Skinner.

CALCUTTA SECTION

As Member :
R. G. P. S. Fairbairn.
As Associate Members :
E. A. Khan, A. Miller, A. K. Mookherji, S. Prakash, R. Sarkar, H. C. Talbot, H. C. Wilson.
As Graduate :
D. Ghose.
As Students :
S. K. Chattopadhyaya, J. C. Varma.
Transfer—
From Intermediate Associate Member to Associate Member :
M. S. Patra.

CORNWALL SECTION

Transfer—
From Associate Member to Member :
V. J. Vaughan.

COVENTRY SECTION

As Graduates :
W. A. Collett, A. G. Diggle, L. C. Wright.
As Student :
D. A. Manuel.
Transfer—
From Graduate to Associate Member :
J. T. M. Hawes.

DUNDEE SECTION

Transfer—
From Associate Member to Member :
A. J. B. Martin.

EASTERN COUNTIES SECTION

As Associate Member :
B. Mee.

As Student :
B. W. Scott.

Transfer—
From Graduate to Associate Member :
P. C. T. Goodrum.

GLASGOW SECTION

As Associate :
J. R. McAllister.

As Student :
D. C. Loudon.

As Graduates :
A. B. Alexander, S. G. Mukherjee.

Transfer—
From Associate Member to Member :
J. MacGregor.

From Graduate to Associate Member :
J. C. Johnson, A. P. Oppenheimer.

HALIFAX SECTION

New Affiliated Firm :
Wm. Newsome & Son Ltd.

New Affiliate Representatives :
L. G. Whiteley, H. H. Ellis.

LEICESTER SECTION

As Member :
D. S. Player.

As Students :
S. A. L. Bowden, M. N. Brown, K. B. Chell.

As Associate Members :
F. M. Lomas, C. H. Spencer.

Transfers—
From Associate Member to Member :
T. H. Sparrow.

From Graduate to Associate Member :
G. Aldridge.

LINCOLN SECTION

As Associate Member :
H. Bolton.

LIVERPOOL SECTION

As Graduate :
K. H. Jones.

As Student :
A. Gibson.

Transfer—
From Graduate to Associate Member :
T. E. Hines.

From Student to Graduate :
A. J. Vine.

LONDON SECTION

As Member :
W. T. Body.

As Associate Members :
S. L. Farmery, H. F. Johnson, B. R. T. Keene, C. L. Knight, G. A. Rohan, B. L. Steward, K. Warner-Jones, G. L. F. Welham.

Reinstatement as Associate :
A. MacNiven-Brown.

As Graduates :
R. W. Atkinson, W. H. Bosher, A. D. Riley, P. R. Browse.

As Students :
J. D. W. Aston, E. A. Brooks, J. R. Burton, G. W. Fielder, D. A. Pattenden, C. J. Savage, G. J. Thomas.

NEW AFFILIATED FIRM :
G. A. Harvey & Co., (London) Ltd.

AFFILIATE REPRESENTATIVES :
W. S. Parlett and E. R. Hails.

TRANSFERS—

FROM INTERMEDIATE ASSOCIATE MEMBER TO ASSOCIATE MEMBER :
H. F. Allen, E. J. Cathersides, J. A. Cook.

FROM GRADUATE TO ASSOCIATE MEMBER :
E. Fedder, J. W. Kelson, H. S. Thomas.

FROM STUDENT TO GRADUATE :
T. Clowry, M. S. Davis, E. H. Hands, N. E. D. Humphrey, E. G. Liddiard.

LUTON SECTION

AS STUDENT :
P. W. Wilkes.

MANCHESTER SECTION

AS ASSOCIATE MEMBERS :
A. Bailey, E. Peck, R. D. Stafford.

TRANSFER—

FROM GRADUATE TO ASSOCIATE MEMBER :
P. K. Eisner.

MELBOURNE SECTION

AS ASSOCIATE MEMBER :
W. Donaldson.

AS STUDENT :
A. L. Galvin.

TRANSFERS—

FROM ASSOCIATE MEMBER TO MEMBER :
F. J. Malone.

FROM INTERMEDIATE ASSOCIATE MEMBER TO ASSOCIATE MEMBER :
E. A. Curwood.

SUCCESSFUL CANDIDATE IN THE 1952 ASSOCIATE MEMBERSHIP EXAMINATION :

FROM STUDENT TO GRADUATE :
D. Turner.

NORTH EASTERN SECTION

AS ASSOCIATE MEMBER :
W. Hirst.

AS STUDENT :
R. Whitwell.

TRANSFERS—

FROM GRADUATE TO ASSOCIATE MEMBER :
C. E. Barkworth, J. R. Ladkin, R. K. Snowball.

NOTTINGHAM SECTION

AS MEMBERS :
W. G. Chasteauneuf, A. E. Gordon.

AS ASSOCIATE MEMBERS :
F. E. Hobson, C. H. Hodgkins.

AS STUDENTS :
R. G. Bullock, G. K. Sykes, R. Turrill.

PRESTON SECTION

TRANSFER—

FROM GRADUATE TO ASSOCIATE MEMBER :
C. Windle.

READING SECTION

AS ASSOCIATE MEMBERS :
J. B. Douglas, H. G. Evans, J. Hastings.

AS GRADUATE :
W. J. Paul.

TRANSFERS—

FROM STUDENT TO GRADUATE :
L. J. Lambourne, L. J. Upstone.

ROCHESTER SUB-SECTION

As Students :
R. E. Axby, D. E. Bolwell, R. G. Cole.
Transfer—
From Associate Member to Member :
W. Hodgisson.

SHEFFIELD SECTION

As Member :
W. Washbourne.
As Graduates :
B. Smith, B. Wilcock.
Transfer—
From Associate Member to Member :
W. Udall.

SOUTH AFRICA SECTION

As Member :
H. H. W. Behrens.
As Student :
A. R. Adams.

SOUTH ESSEX SUB-SECTION

As Associate Members :
J. F. E. Beglan, E. S. Hammett.
As Graduate :
R. Pratap.
Transfer—
From Graduate to Associate Member :
S. G. Hayden.

SOUTHERN SECTION

As Member :
R. T. Brown.

SOUTH WALES SECTION

As Associate Member :
W. L. Brenchley.
Transfer—
From Graduate to Associate Member :
D. R. J. Russell.

SYDNEY SECTION

As Member :
L. Hasemer.
As Graduate :
K. B. Smith.
As Associate Member :
E. F. Hewison.
As Student :
J. S. Ryan.

WESTERN SECTION

As Associate Members :
R. E. Gustine, F. J. Perry.
As Student :
T. H. Marsden-Jones.

WEST WALES SECTION

As Associate Member :
G. W. Bullock.

WOLVERHAMPTON SECTION

As Associate Member :
M. H. Slater.
As Students :
P. G. W. Astley, H. Watton, T. D. J. Weaver.
Transfers—
From Graduate to Associate Member :
D. E. Graham, N. T. Harper.
From Student to Graduate :
L. P. Hulse.

YORKSHIRE SECTION

As Associate Member :
A. Dyson.

As Student :
A. L. Sykes.

NO SECTION

As Associate Members :
M. H. Moore, M. Pratt, J. L. Stevenson.

Transfer—
From Associate Member to Member :
F. D. H. Ronald.

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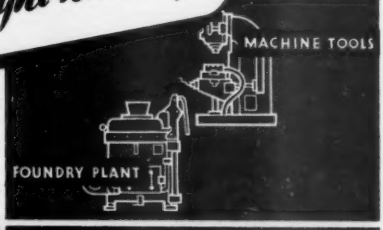

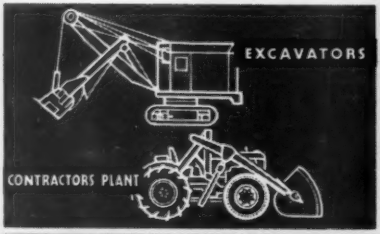

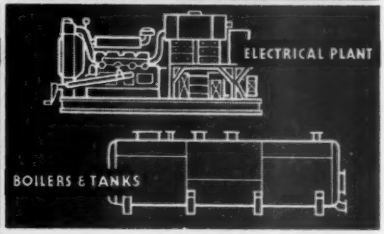

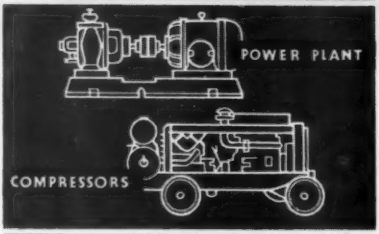

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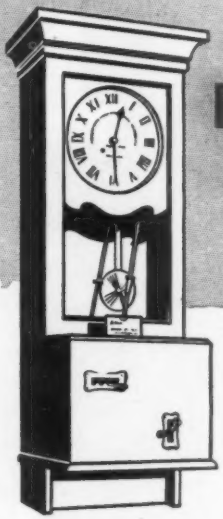

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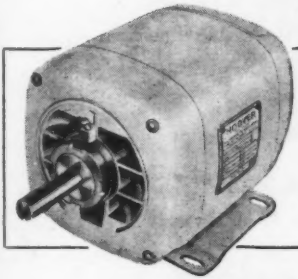

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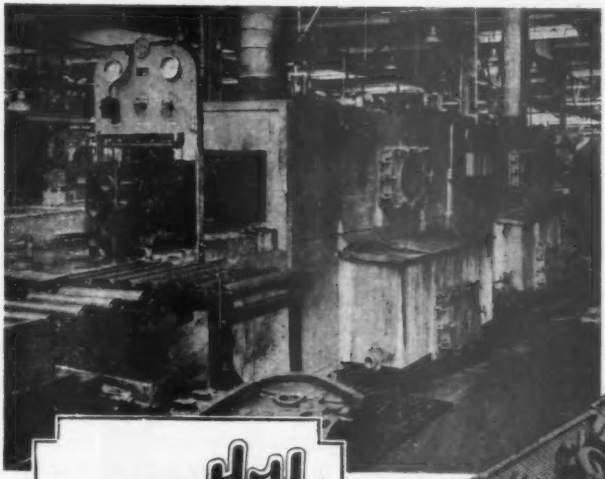

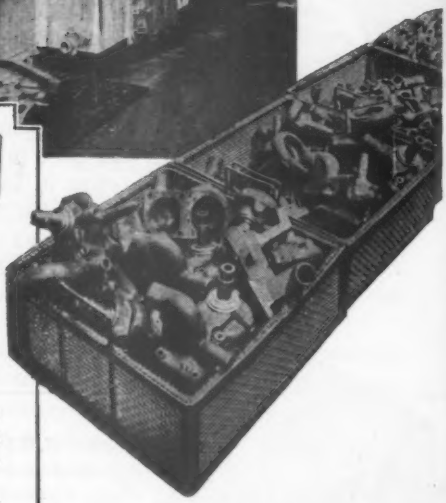

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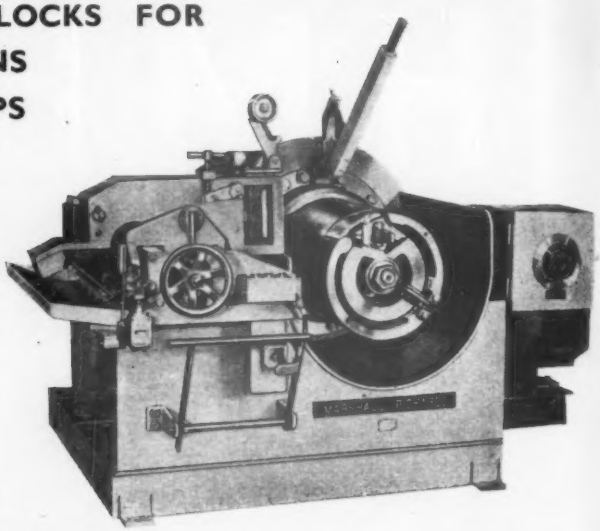

The Horizontal Bull Block shown here is specially designed for dealing with sections and strip. The pulling-in dog is on a long chain and disappears into the block when drawing commences. A hinged flap automatically closes the recess and provides a continuous periphery onto which the sections are drawn without marking.

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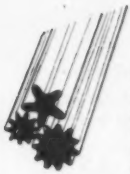
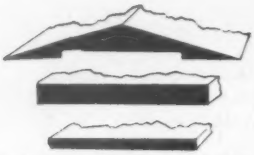


Drawn in a continuous spiralavoiding damage to the contours of the teeth.



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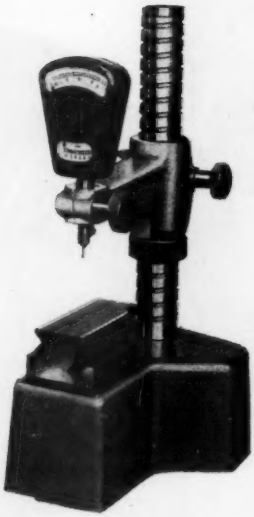

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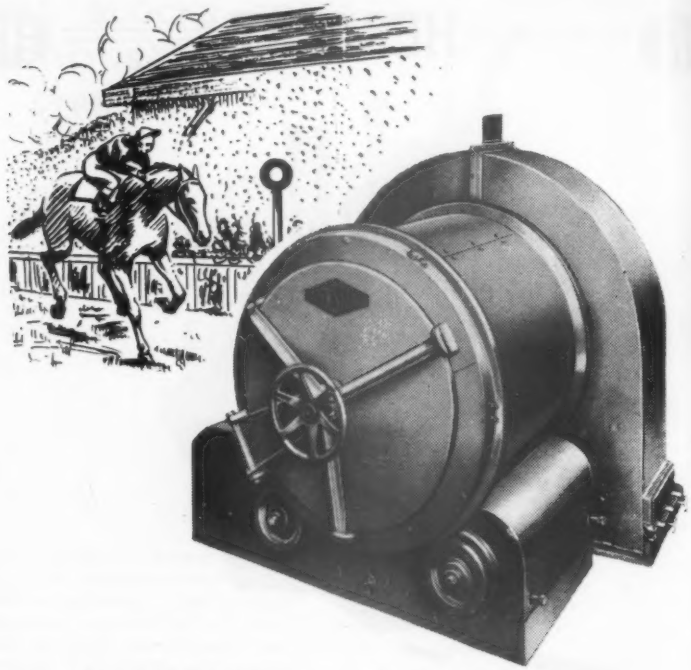

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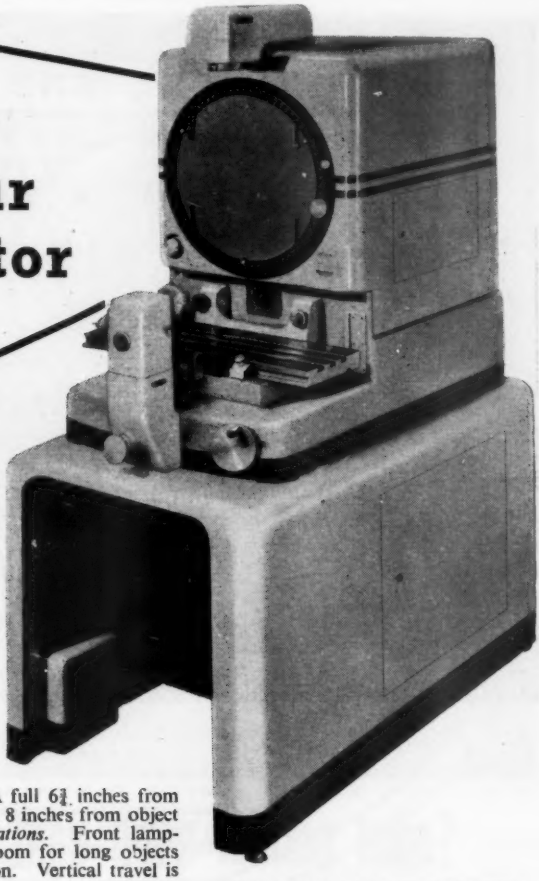

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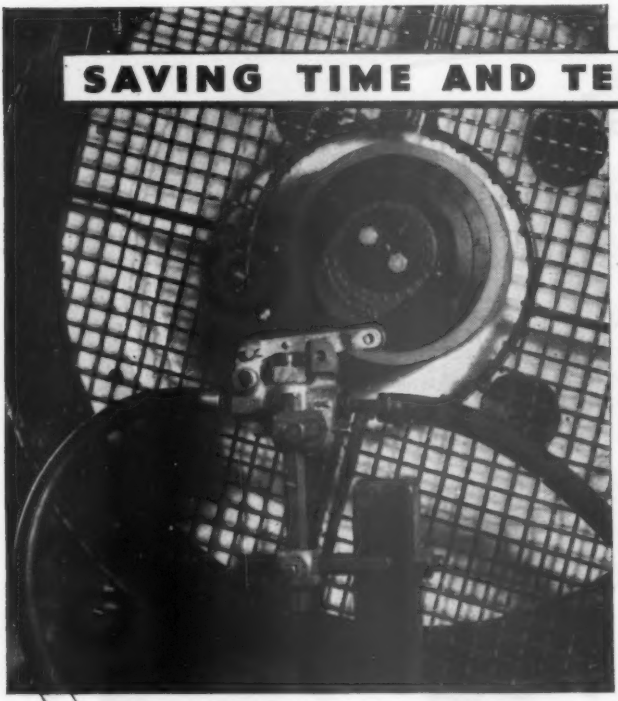

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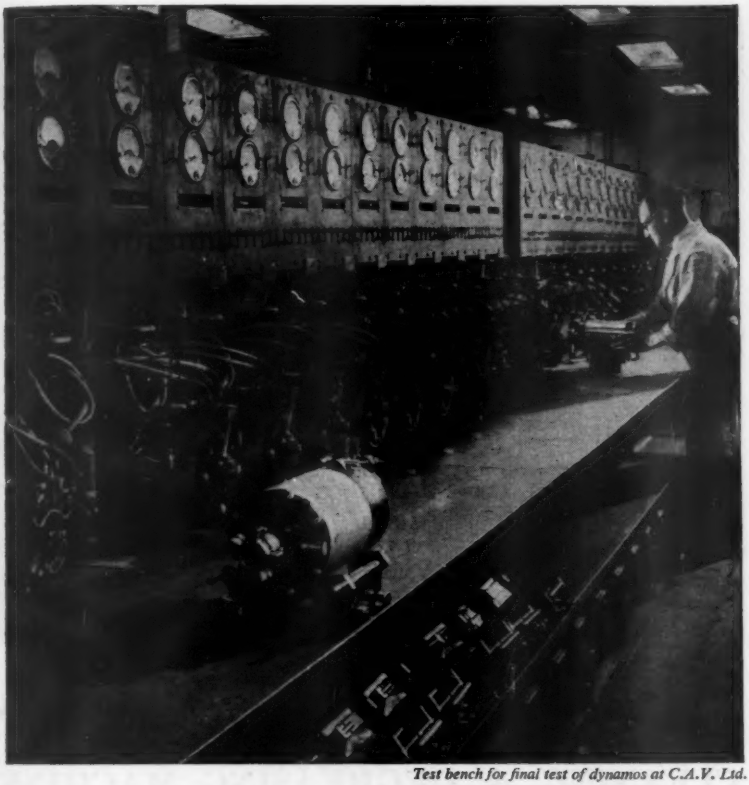

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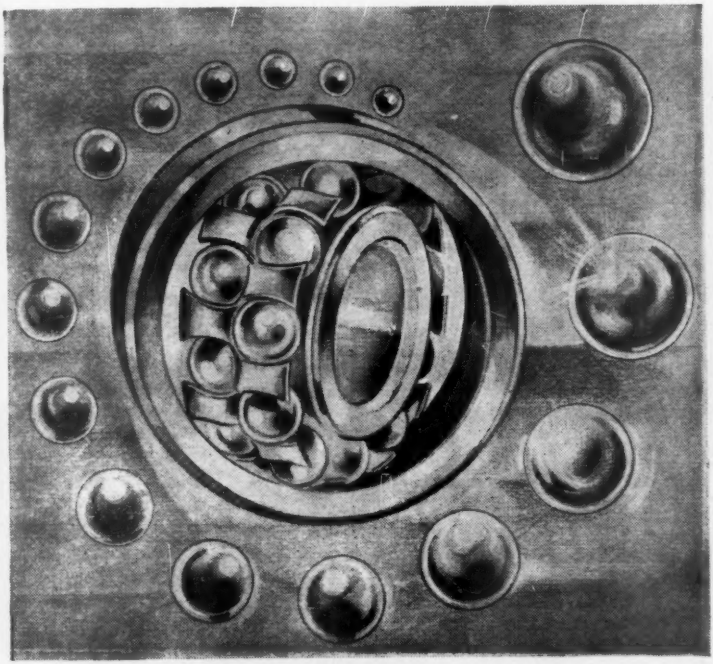

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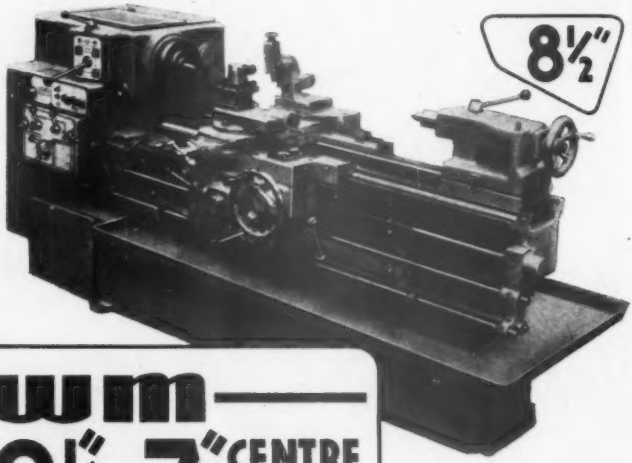

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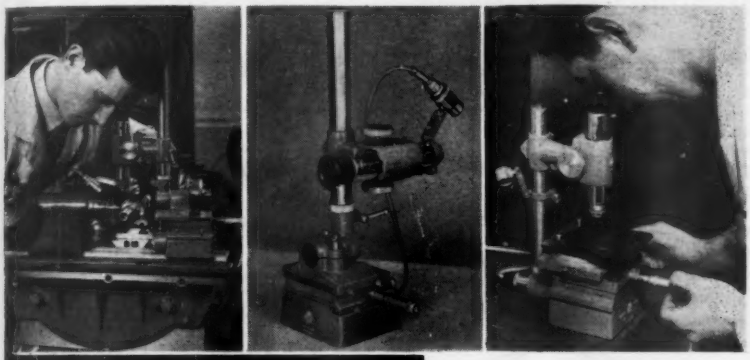

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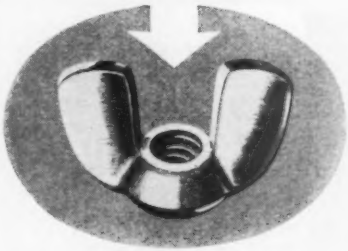

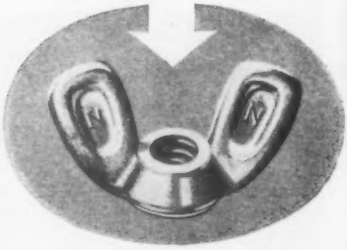

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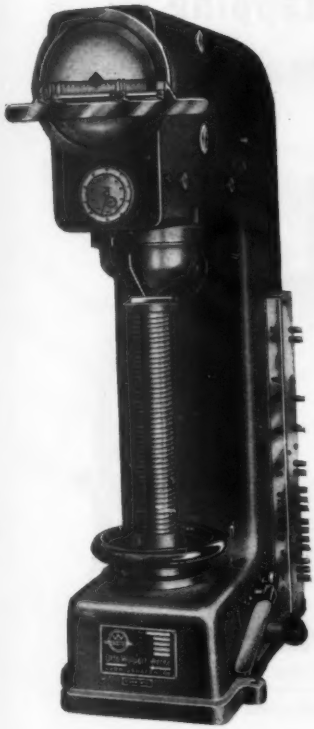

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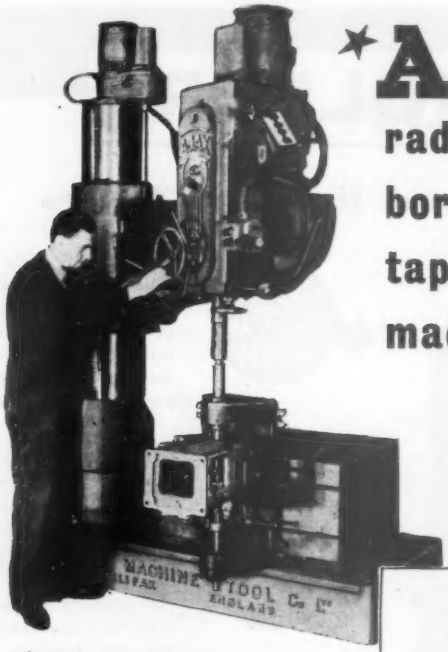

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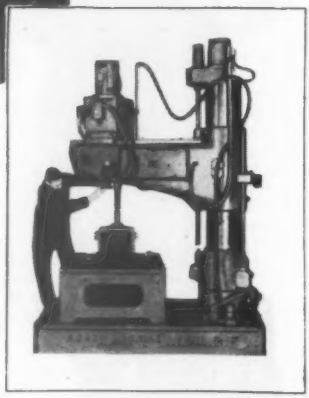

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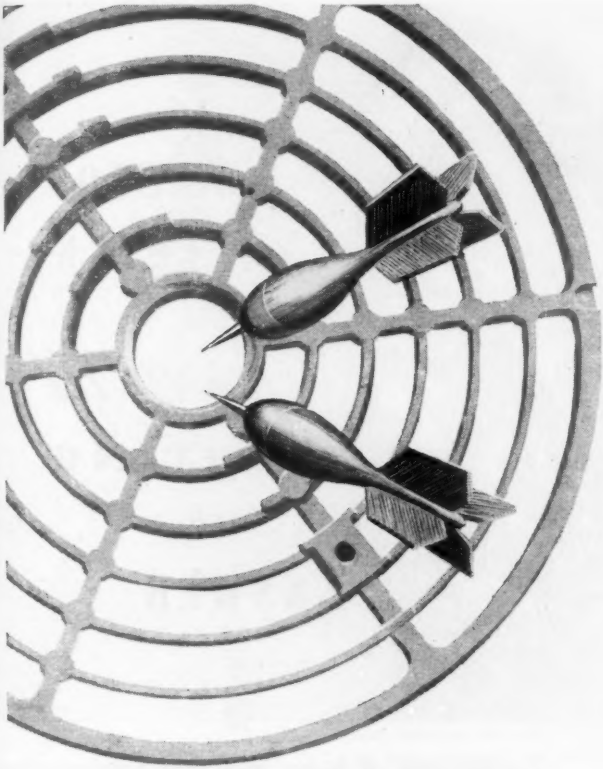

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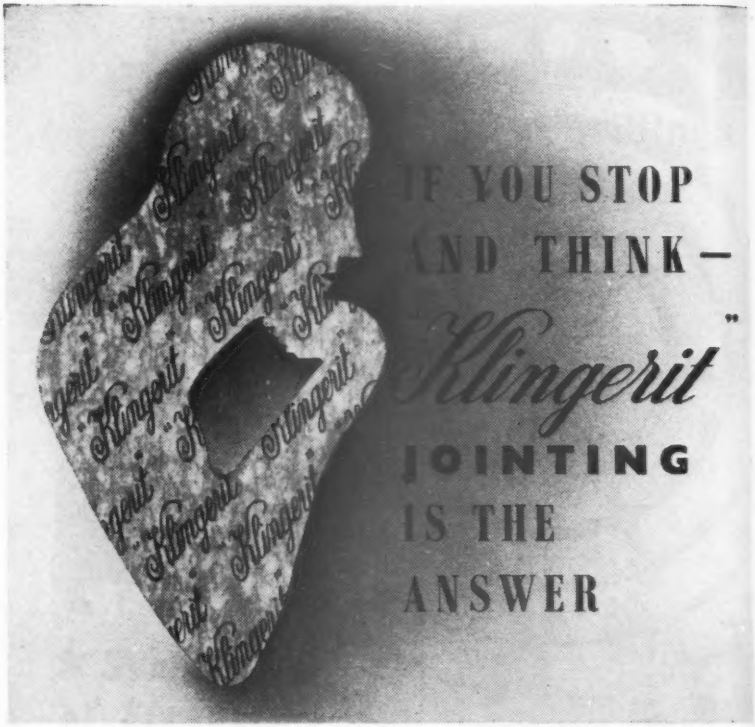

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A12/C

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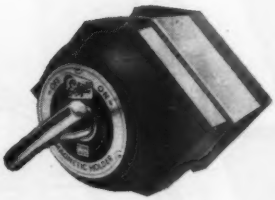

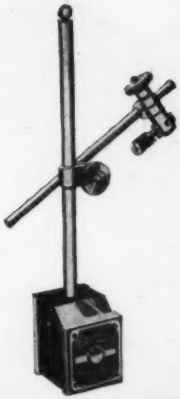

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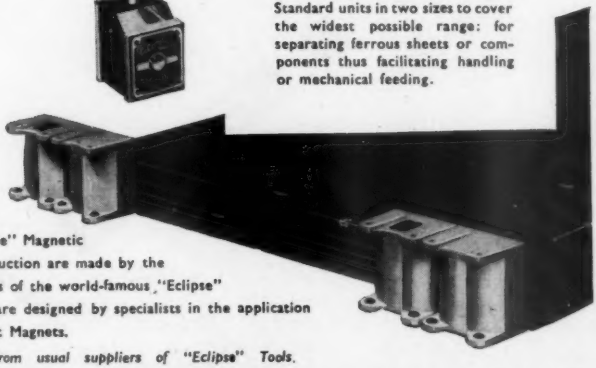

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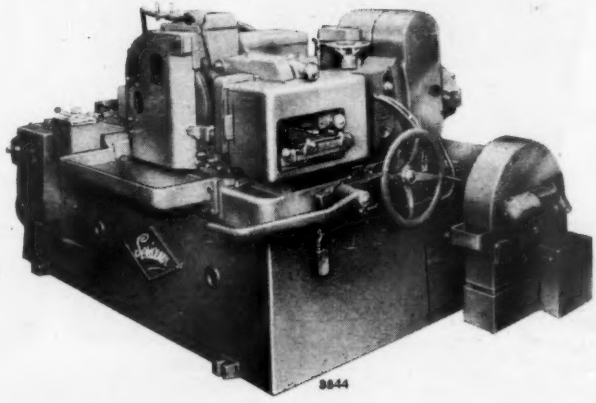

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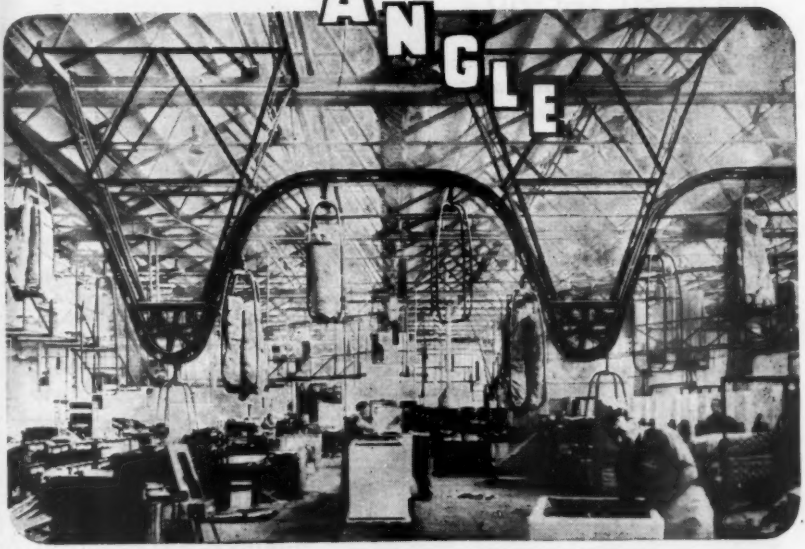

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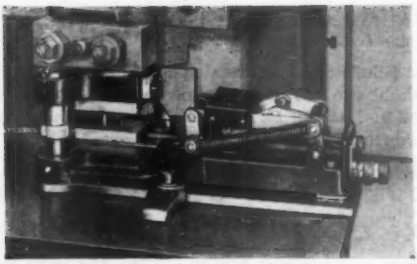

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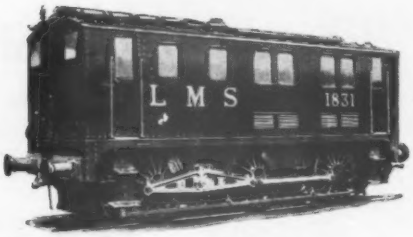

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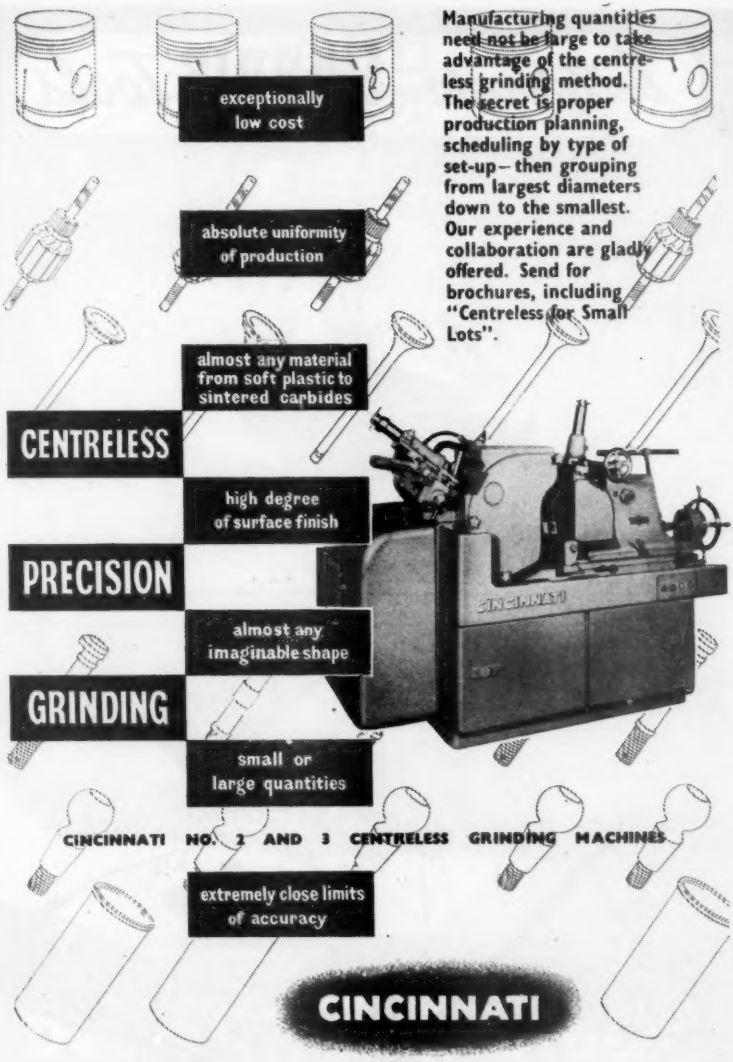
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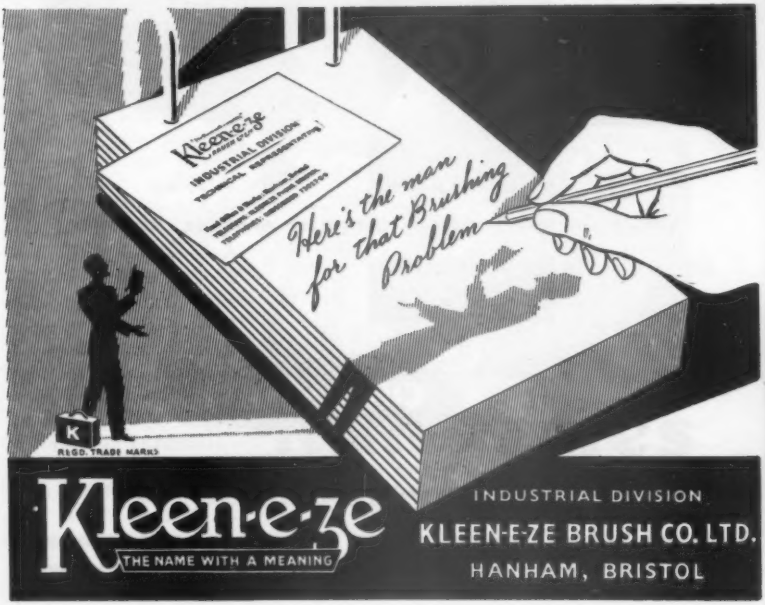

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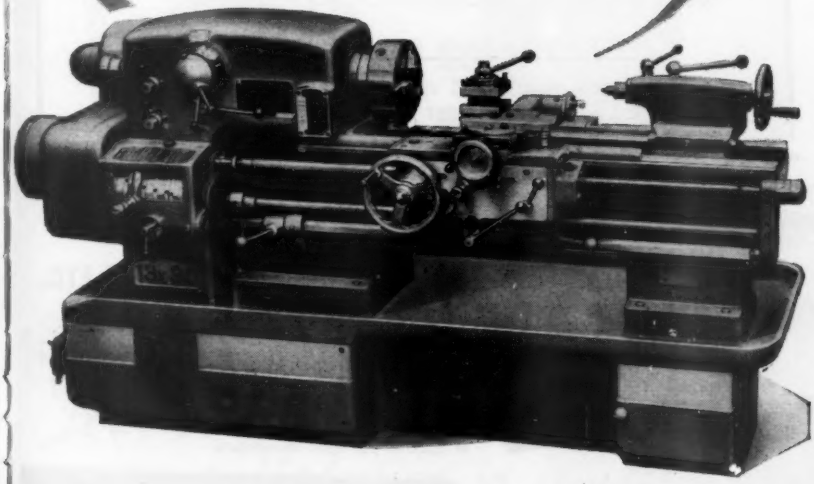

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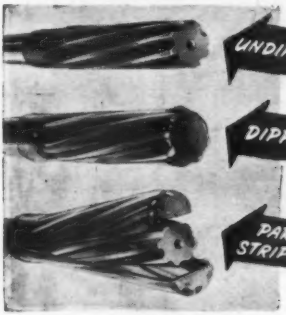

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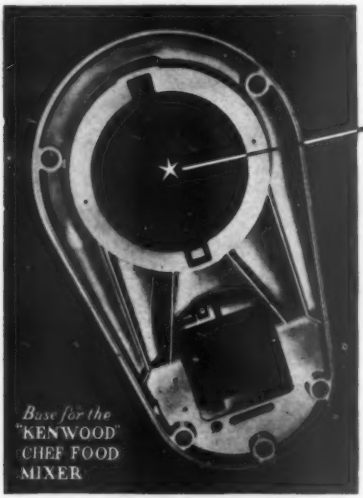

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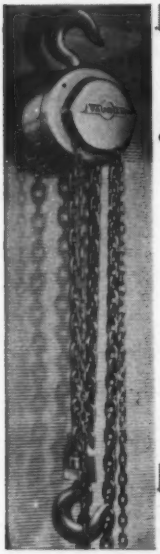

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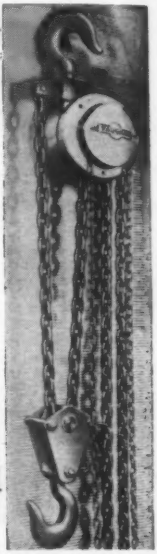

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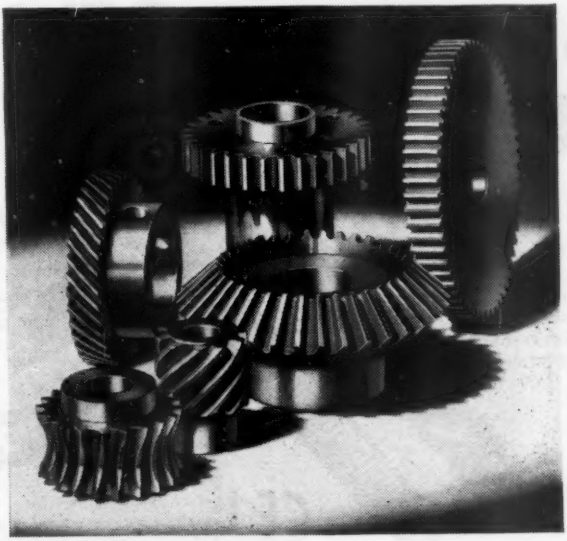

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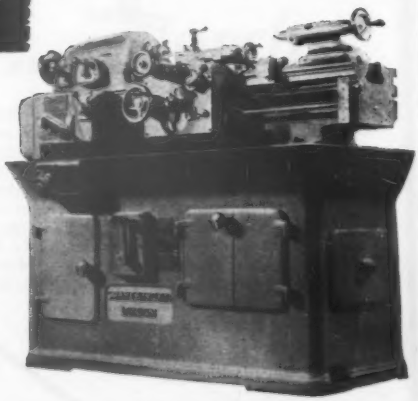

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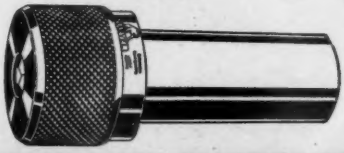

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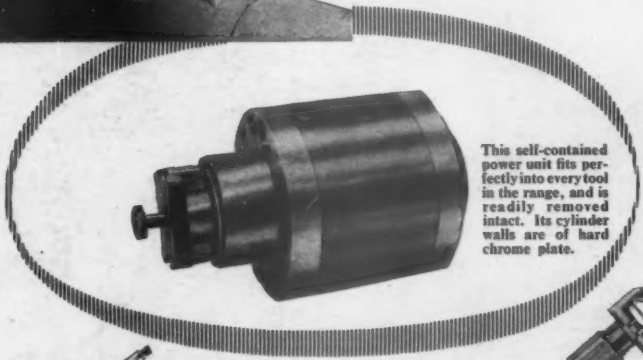

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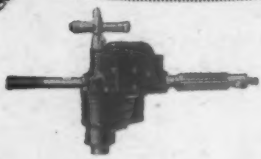

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